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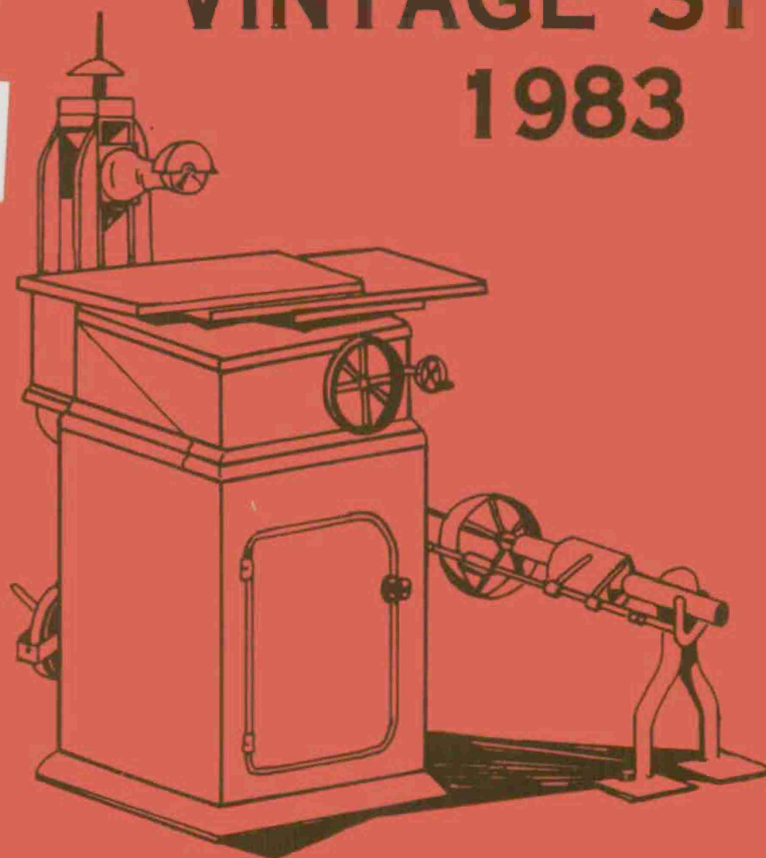
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# VINTAGE STUDY 1983

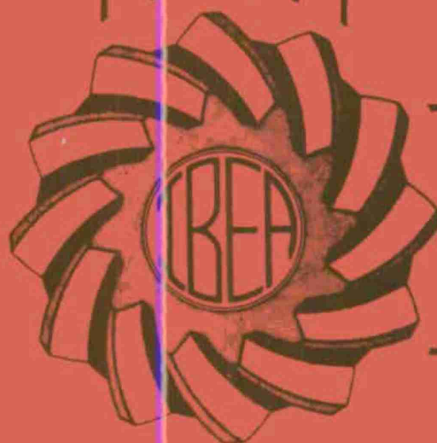
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DEPARTMENT OF THE ARMY  
INDUSTRIAL PLANT EQUIPMENT  
(IPE)



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US ARMY INDUSTRIAL BASE ENGINEERING ACTIVITY  
ROCK ISLAND, ILLINOIS

61299

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exceeding useful service life are portrayed for each type. The status of numerical control (NC) equipment is presented showing the classes, quantity and use, and trends of the inventory.

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VINTAGE STUDY

1983

Department of the Army  
Industrial Plant Equipment  
(IPE)

PREPARED BY

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"Reviewed for OPSEC"

## PREFACE

This study was conducted in compliance with paragraph 5-2c(6), AR 700-90. It is an analysis of Department of the Army industrial plant equipment, active and inactive, based on year of manufacture. A comparison of active Government equipment with private industry is made based on three age groups: 0-9 years old, 10-19 years old, and 20 years or older. The equipment status within the US Army Materiel Development and Readiness Command (DARCOM) is presented for five types of IPE for the major subordinate commands and laboratories and centers. The vintage (age distribution) and quantity and percent exceeding useful service life are portrayed for each type. The status of numerical control (NC) equipment is presented showing the classes, quantity and use, and trends of the inventory.

The change in the definition for IPE during the year which resulted in a reduction of 66,648 items is reflected in this study. The change increases the acquisition cost criteria and deleted 19 Federal Supply Classes (FSC's). FSC 6625, electrical testing and measuring equipment, is no longer included in this study because it is one of the deleted FSC's.



## VINTAGE STUDY

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## INTRODUCTION

This study is an analysis of Department of the Army industrial plant equipment (IPE) based on year of manufacture. Five types of IPE are considered: metalcutting, welding, metalforming, heat treating and furnaces, and mechanical testing and measuring equipment. Illustrations of each type and the selected Federal Supply Classes (FSC) are contained in Appendix A. The age of the equipment is illustrated by sorting it into three age groups: 0 to 9 years old, 10 to 19 years old, and 20 years or over. On this basis, Government equipment is compared with private industry. This comparison provides a means to evaluate whether the acquisition of IPE within the Department of the Army is keeping pace with private industry. A comparison of equipment age with useful service life is also made.

The DIPEC SP-57 Report, dated 30 December 1982, The Central Inventory of IPE Report as of 31 December 1982, and the DIPEC SP-50 Report as of 28 January 1983 served as the source documents for Government equipment. Industry data was obtained from the Tenth, Eleventh, and Twelfth Inventories of Metalworking Equipment published in 1968, 1973, and 1978, respectively, by the American Machinist Magazine, a McGraw-Hill publication.

Equipment age is not necessarily the best or only criteria to determine usefulness or capability. Other factors such as use and maintenance strongly influence a machine's serviceability. However, equipment age does provide a convenient yardstick by which a comparison can be made.

It is reasonable to assume that production equipment used by private industry is subjected to essentially uninterrupted service, necessitating earlier replacement. On the other hand, much of the Government equipment is used intermittently. Generally, equipment of a more recent year of manufacture possesses improved operating characteristics, and it follows that the newer equipment possesses improved production capabilities. But, items of equipment with an older year of manufacture may perform very satisfactorily for a given, specific purpose.

This study is not concerned with all these detailed considerations, but concentrates on equipment age only.

## SECTION I

### DEPARTMENT OF THE ARMY

The Department of the Army (DA) inventory of industrial plant equipment (IPE) consists of 52,228 items with an acquisition cost of \$1.568 billion. The change in the definition for IPE during the year resulted in a reduction of 66,648 items. The change increases the acquisition cost criteria and deleted 19 Federal Supply Classes (FSC's). FSC 6625, electrical testing and measuring equipment, is not included in this study because it is one of the deleted FSC's.

The status of the Department of the Army inventory is shown in Figure I-1. The total inventory is characterized by small changes with a decreasing trend except for 1978 and 1979. The increase during these years is attributed to the transfer of IPE from the USN as part of the single manager for conventional ammunition.

Annual inventory status changes for active and inactive equipment are shown in Figure I-2. The large decrease in active IPE in 1974 reflects the reduction of production to support the war in Vietnam; the corresponding increase in inactive IPE reflects the retention of much of it in plant equipment packages (PEP's). The noticeable increase of inactive equipment in 1978 was caused by the transfer of USN PEP's to the Army as part of the single manager for conventional ammunition. The trend since 1979 has been characterized by increases in active IPE and decreases in inactive IPE.

The US Army Materiel Development and Readiness Command (DARCOM) controls 94 percent of the items representing 98 percent of the acquisition cost of the Department of the Army (DA) inventory. As shown in Figure I-3, DARCOM is clearly the major user of IPE within DA.

In view of this, the items controlled by DARCOM can be considered representative of DA.

#### ACTIVE EQUIPMENT

Most of the equipment controlled by DARCOM, 29,465 items or 60 percent, is active. The quantity and percent of selected types of this equipment exceeding useful service life is shown in Figure I-4.

The quantity and percent exceeding useful service life continues to be unfavorable. It varies from 29 percent for welding equipment to 63 percent for metalforming equipment. In 1987, five years from now, these percentages will increase to 49 percent and 68 percent respectively. Metalcutting and metalforming equipment have the highest percent exceeding useful service life. This is significant because of the relatively higher cost of these items. Metalcutting equipment, with 7,921 items, is the type with the greatest number exceeding useful service life; metalforming equipment is a distant second with 1,553 items, and mechanical testing and measuring equipment is third with 766 items.

The vintage (age distribution) of active equipment is shown in Figure I-5. Metalcutting equipment is the oldest with 8,682 items, or 67 percent, 20 or more years old. Welding equipment is the newest with 224 items, or 43 percent, less than ten years old.

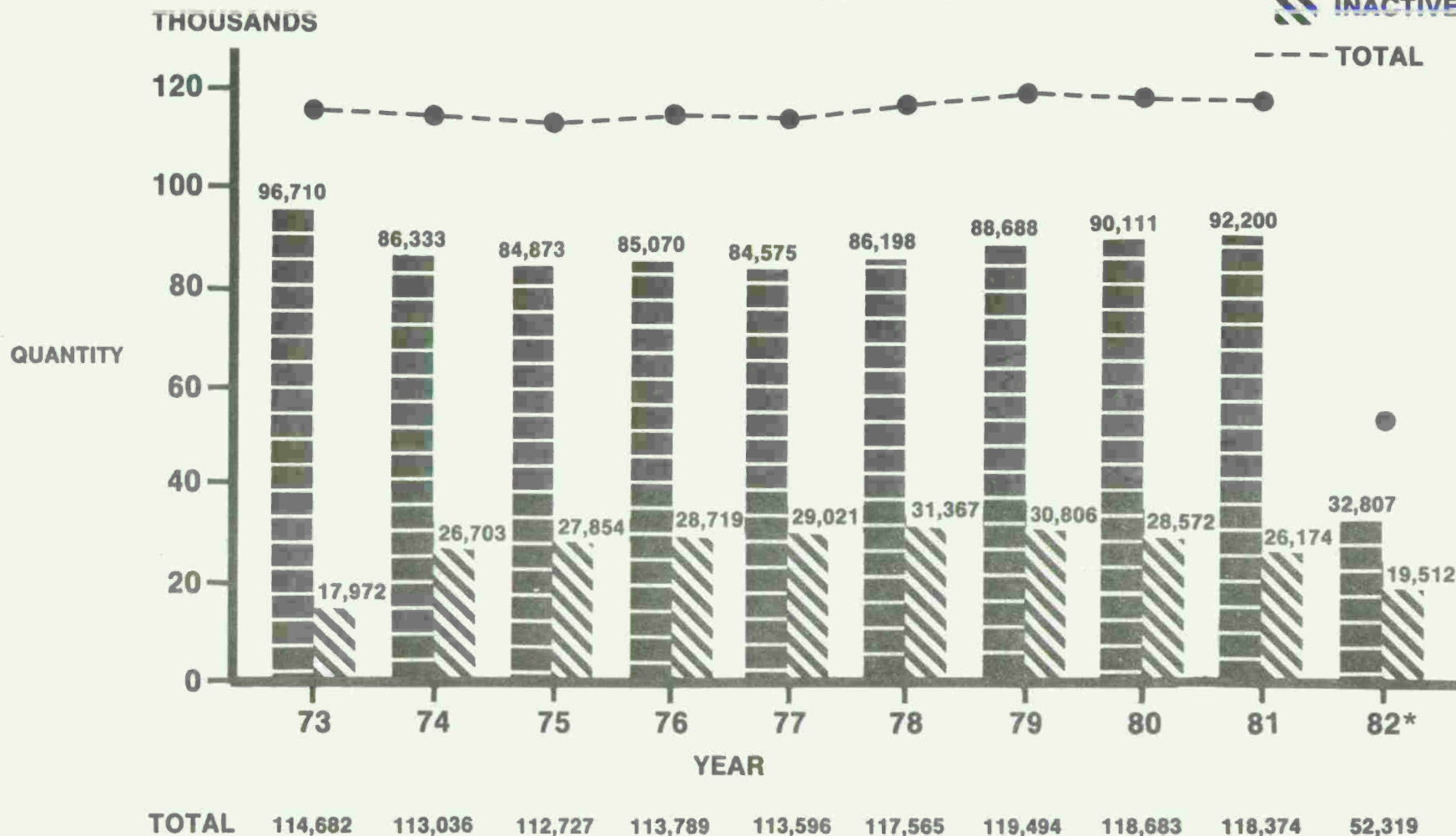
#### INACTIVE EQUIPMENT

The vintage (age distribution) of DARCOM inactive equipment is shown in Figure I-6. As might be expected, the inactive equipment has an older age profile than does the active equipment. Metalcutting equipment has the highest number, 9,160 items, and the highest percent, 89 percent, in the 20 year and over age group. The percentage of metalforming equipment, 20 years old or older is the same as metalcutting equipment but far behind in quantity with only 2,353 items. Mechanical testing and measuring equipment has the most favorable profile with 12 percent, 62 items, less than ten years old and 54 percent, 280 items, more than 20 years old.

# DEPARTMENT OF THE ARMY INVENTORY OF IPE

 ACTIVE  
 INACTIVE

--- TOTAL



**NOTE:**

\* DECONTROL OF NUMEROUS ITEMS WAS  
 RESPONSIBLE FOR THE ABNORMAL  
 DROP OF THE INVENTORY

FIGURE I-1



# DEPARTMENT OF THE ARMY INVENTORY STATUS CHANGES FOR IPE

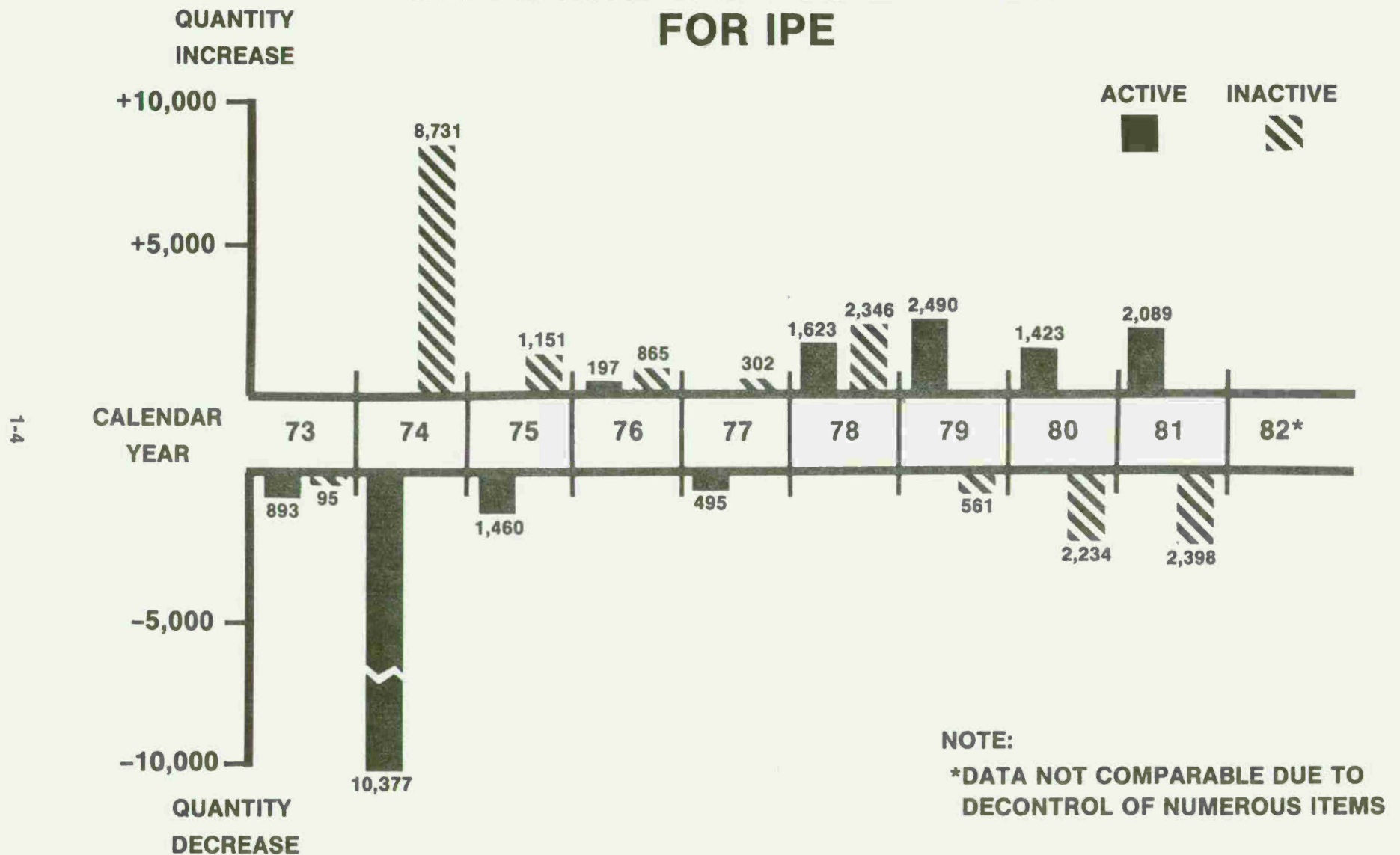


FIGURE I-2



## INDUSTRIAL PLANT EQUIPMENT



NOTE: DATA IS AS OF 29 NOV 82.

FIGURE I-3

# **ACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE DARCOM**

1-6

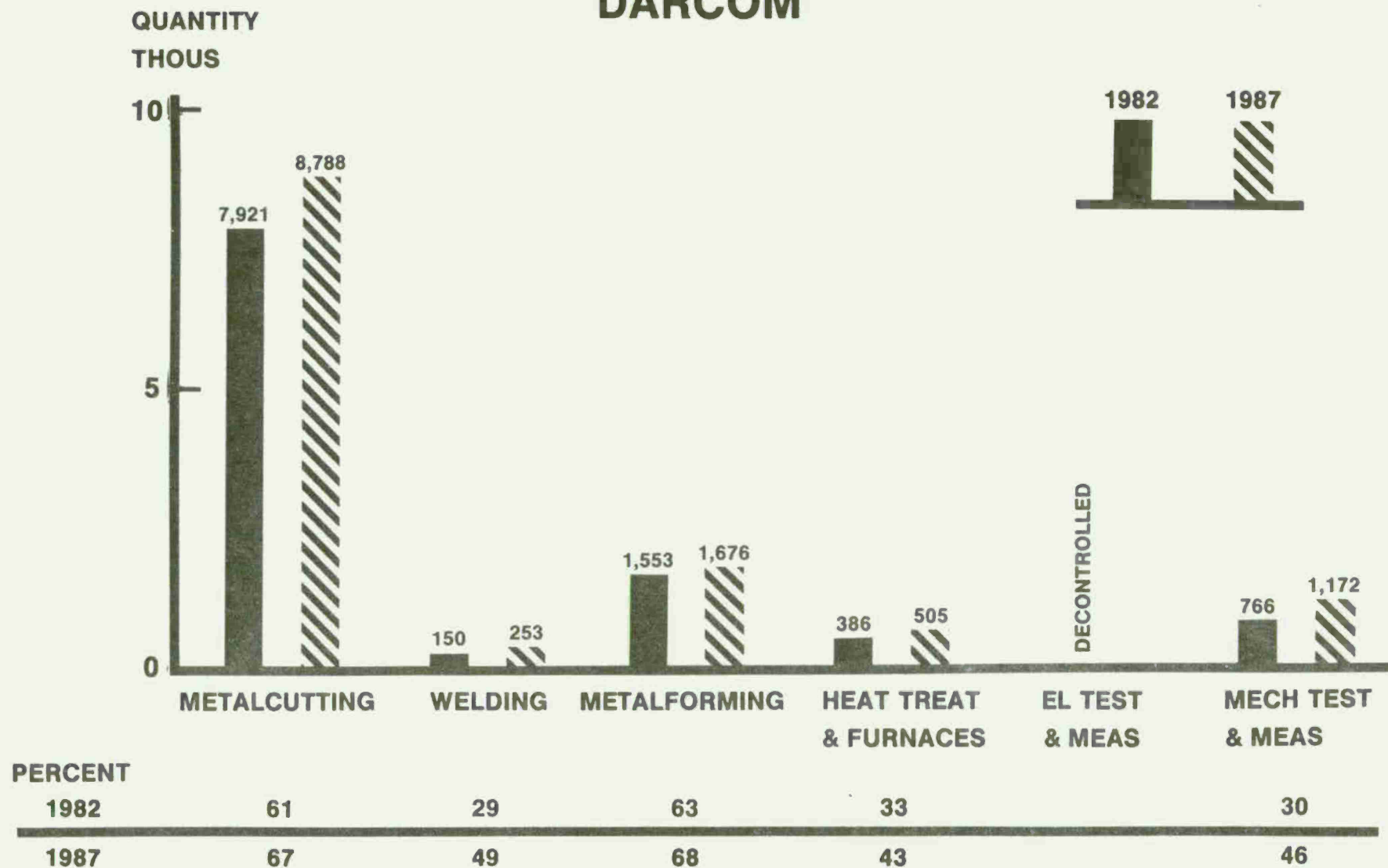


FIGURE 1-4

# ACTIVE EQUIPMENT VINTAGE DARCOM

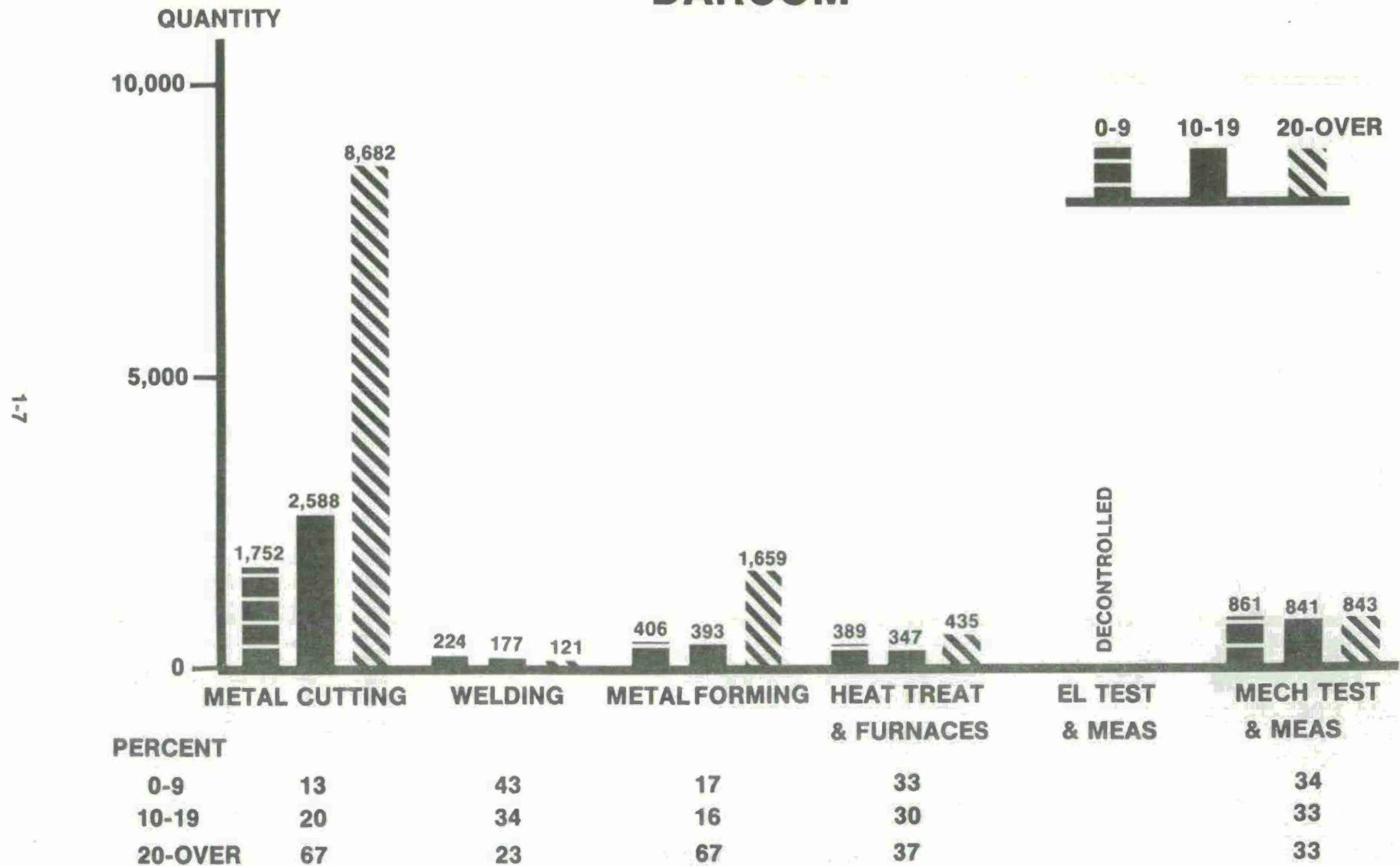


FIGURE 1-5

# INACTIVE EQUIPMENT VINTAGE DARCOM



FIGURE 1-6

## SECTION II

### DARCOM vs. INDUSTRY

An age comparison of DARCOM and private industry equipment is shown in Figure II-1. The data for DARCOM were obtained from previous Vintage Studies. Private industry data were obtained from the Tenth, Eleventh, and Twelfth Inventories of Metalcutting Equipment published in 1968, 1973, and 1978, respectively, by the American Machinist Magazine, a McGraw-Hill publication.

#### METALCUTTING AND METALFORMING EQUIPMENT

The age profile of DARCOM equipment is strongly influenced by the significantly large portion of the inventory that was acquired during the period 1950 to 1954. As a result, the age of the metalcutting and metalforming inventory has shifted from the 10-19 year range in 1968 to the 20 year and over range in 1973 and 1978. This shift also reflects a replacement level that has not kept pace with the aging of the inventory.

Private industry, on the other hand, exhibits a relatively consistent investment in replacement of equipment. As a result, the equipment operated by private industry has a more favorable age profile than the equipment available to the Army. Private industry takes greater advantage of the improved operating characteristics and production capabilities of newer equipment.

#### WELDING/JOINING EQUIPMENT

Private industry and DARCOM equipment exhibit similar status for this type. The shorter useful life which requires earlier replacement seems to be the major reason for this similarity.

#### CURRENT STATUS

A comparison of the current status of DARCOM equipment with private industry equipment is shown in Figure II-2. The age profile of DARCOM equipment continues to be inferior to that of private industry. The percentage of DARCOM metalcutting and metalforming equipment 20 years old and over is about double that of private industry. The profile of welding/joining equipment for DARCOM and private industry is reasonably similar but the comparison is still unfavorable for DARCOM.

#### TRENDS

Private industry appears to have reduced their investment in equipment replacement. A definite decrease in newer equipment, 0-9 years old, and an increase in older equipment, 20 years and older, is evident. In spite of this, the Army is still in an unfavorable position compared to private industry.

## EQUIPMENT REPLACEMENT

An indication of replacement of active equipment can be approximated by the number of items less than ten years old and those 10 to 19 years old. In the last ten years, only 1,752 metalcutting items and 406 metalforming items were added to the inventory. During the previous ten years, 2,588 metalcutting items and 393 metalforming items were added to the inventory.

The number of items that would have to be replaced to make DARCOM's newer equipment, 0-9 years old, comparable to private industry is large. It would require replacement of 2,969 metalcutting items and 345 metalforming items. From these figures it can be seen that the replacement rate for DARCOM is much too low.

Estimating the cost to purchase the equipment to cause the inventory of DARCOM metalcutting and metalforming equipment to approach that of private industry is difficult due to the extreme range of acquisition cost for this equipment. A review of the FY 81 projects revealed that the price range for items approved for acquisition ranged from \$2,905 to \$425,500. The average cost of all IPE as of 31 December 1982 was \$30,185. Because of the wide range in the acquisition cost for industrial plant equipment, average acquisition cost is of limited value. Recognizing this, a very rough estimate of the cost to make the Army's inventory of metalcutting and metalforming equipment approach that of private industry is approximately \$100,033,090.



# DARCOM AND INDUSTRY AGE COMPARISON

YEARS

0-9

10-19

20-OVER



PERCENT

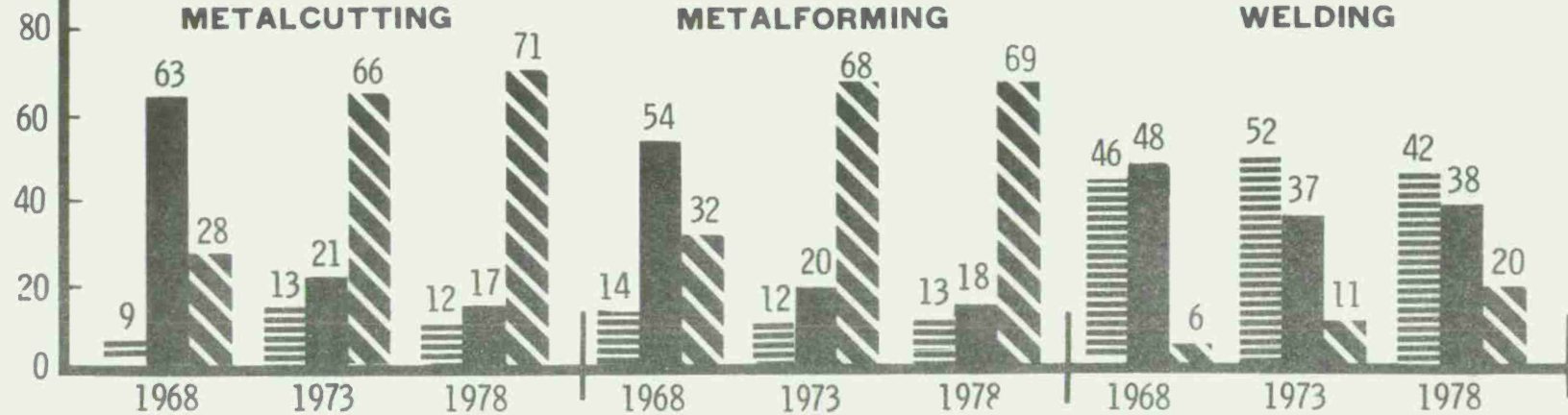
100

## DARCOM

### METALCUTTING

### METALFORMING

### WELDING



PERCENT

100

## INDUSTRY

### METALCUTTING

### METALFORMING

### JOINING

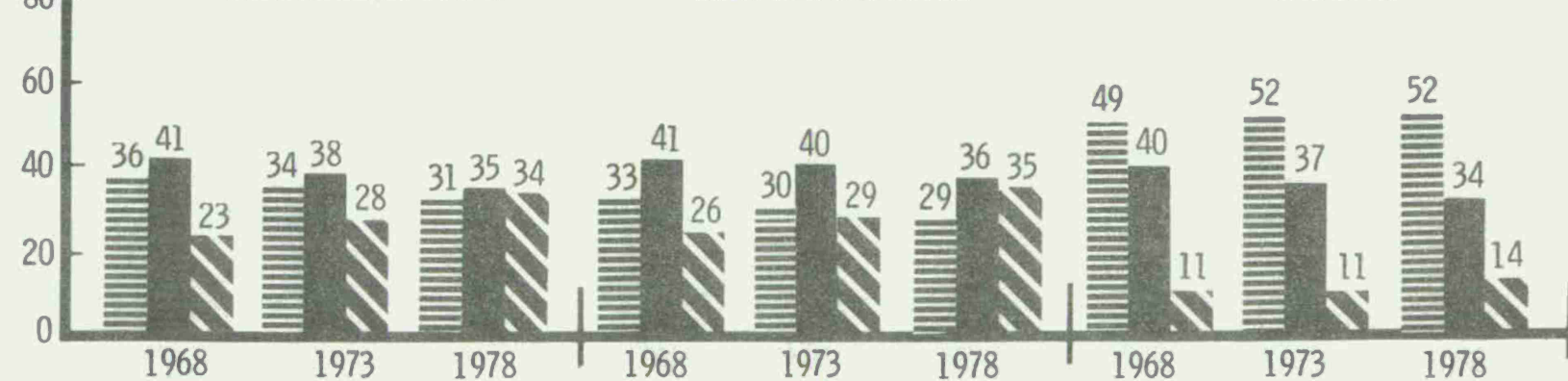


FIGURE II-1

# DARCOM AND INDUSTRY AGE COMPARISON

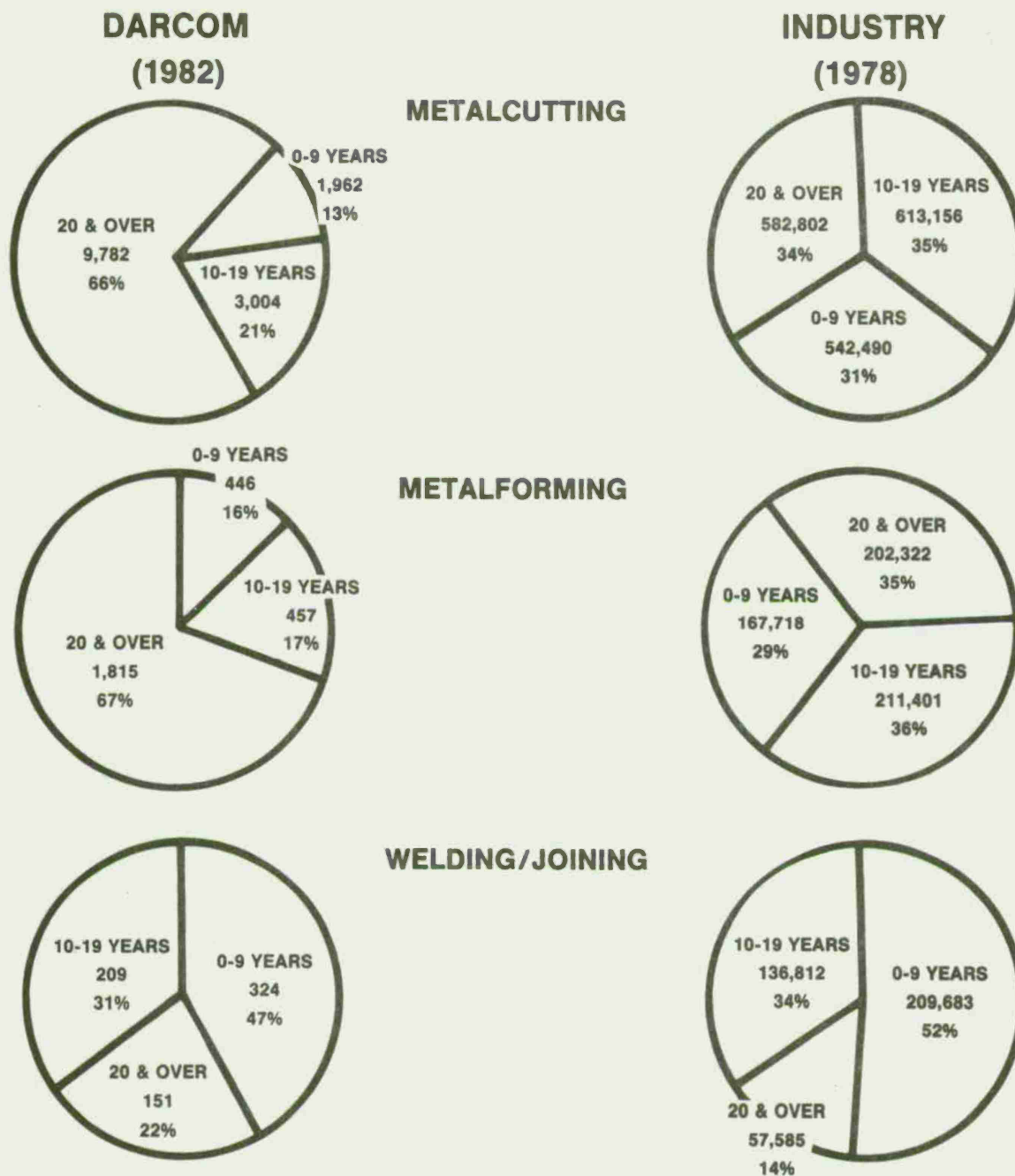


FIGURE II-2

## SECTION III

### EQUIPMENT STATUS WITHIN DARCOM

This section presents the status of each of the five types of IPE for the major subordinate commands (SUBMACOM's) and laboratories and centers (LABS & CENTERS) within DARCOM. The age distribution (vintage) and the quantity and percent exceeding useful service life are portrayed for each type.

The service life data were calculated by DIPEC based on the useful service life contained in AR 700-43 for each class of equipment within each type. These detailed service life listings were averaged for each type to facilitate data assembly.

#### ACTIVE EQUIPMENT

Age Distribution (Vintage). The age distribution for each of the five types of equipment is shown in the following figures:

<u>Type</u>	<u>Figure</u>	<u>Page</u>
METALCUTTING	III-1	3-2
WELDING	III-2	3-3
METALFORMING	III-3	3-4
HEAT TREAT AND FURNACES	III-4	3-5
ELECTRICAL TESTING AND MEASURING	Decontrolled	
MECHANICAL TESTING AND MEASURING	III-5	3-6

The age distribution of active DARCOM equipment is influenced greatly by the type of the equipment.

Metalcutting and metalforming equipment are the oldest, most of it over 20 years old. This is true regardless of which command owns it.

Welding equipment, because of its shorter life, is newer with most of the equipment less than 20 years old.

Heat treating equipment and furnaces are more evenly distributed with respect to age. ERADCOM has the most favorable distribution with 54 percent, 13 items, less than ten years old; and only four percent, one item, over 20 years old. TSARCOM has the most unfavorable distribution with 50 percent, 26 items, over 20 years old.

Electrical testing and measuring equipment has been decontrolled and is no longer included in this study.

Mechanical testing and measuring equipment is generally less than 20 years old. ARRCOM, with 875 items, is by far the greatest user of this type of equipment.

# ACTIVE EQUIPMENT VINTAGE METAL CUTTING

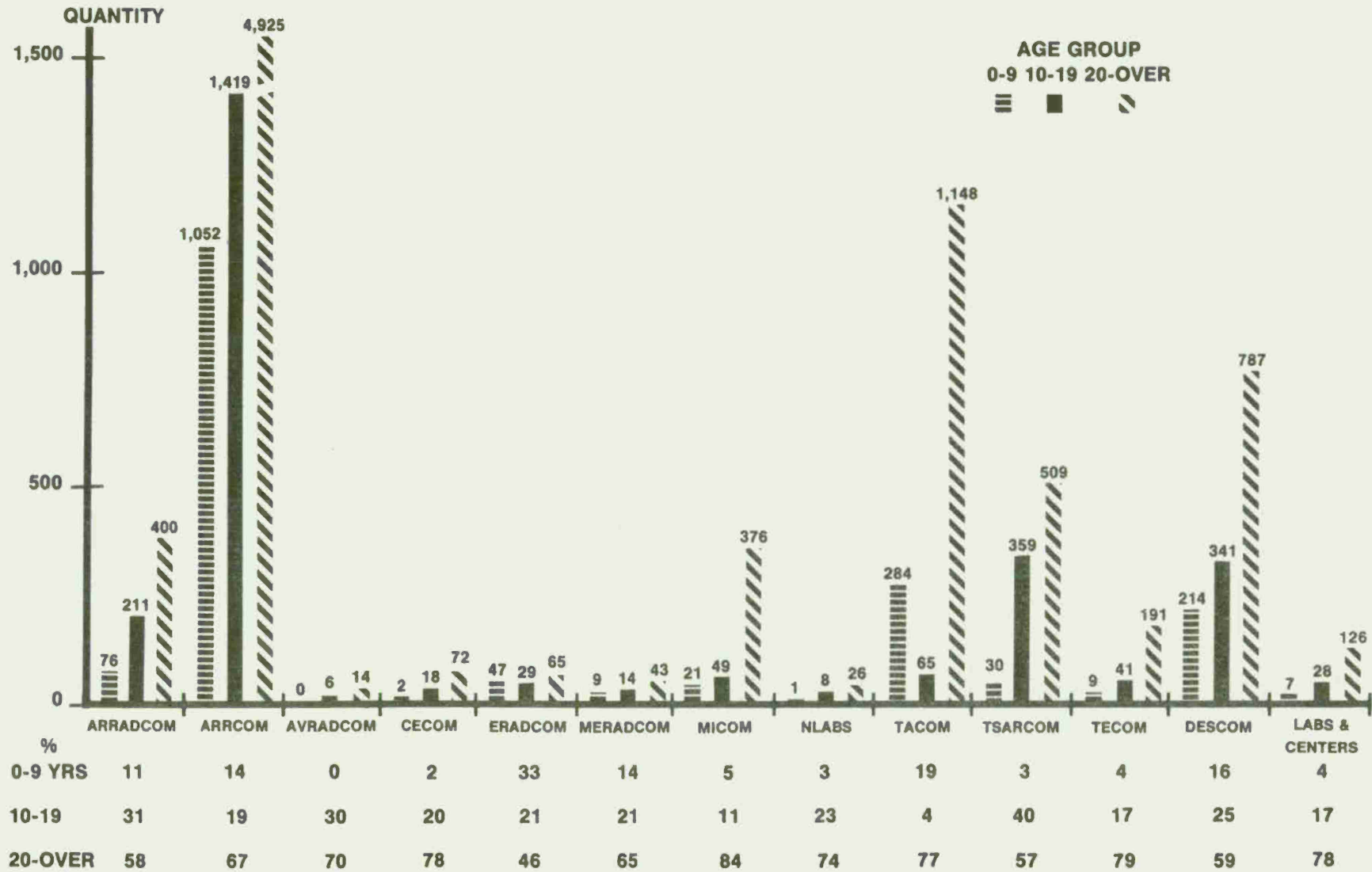


FIGURE III-1

# ACTIVE EQUIPMENT VINTAGE WELDING

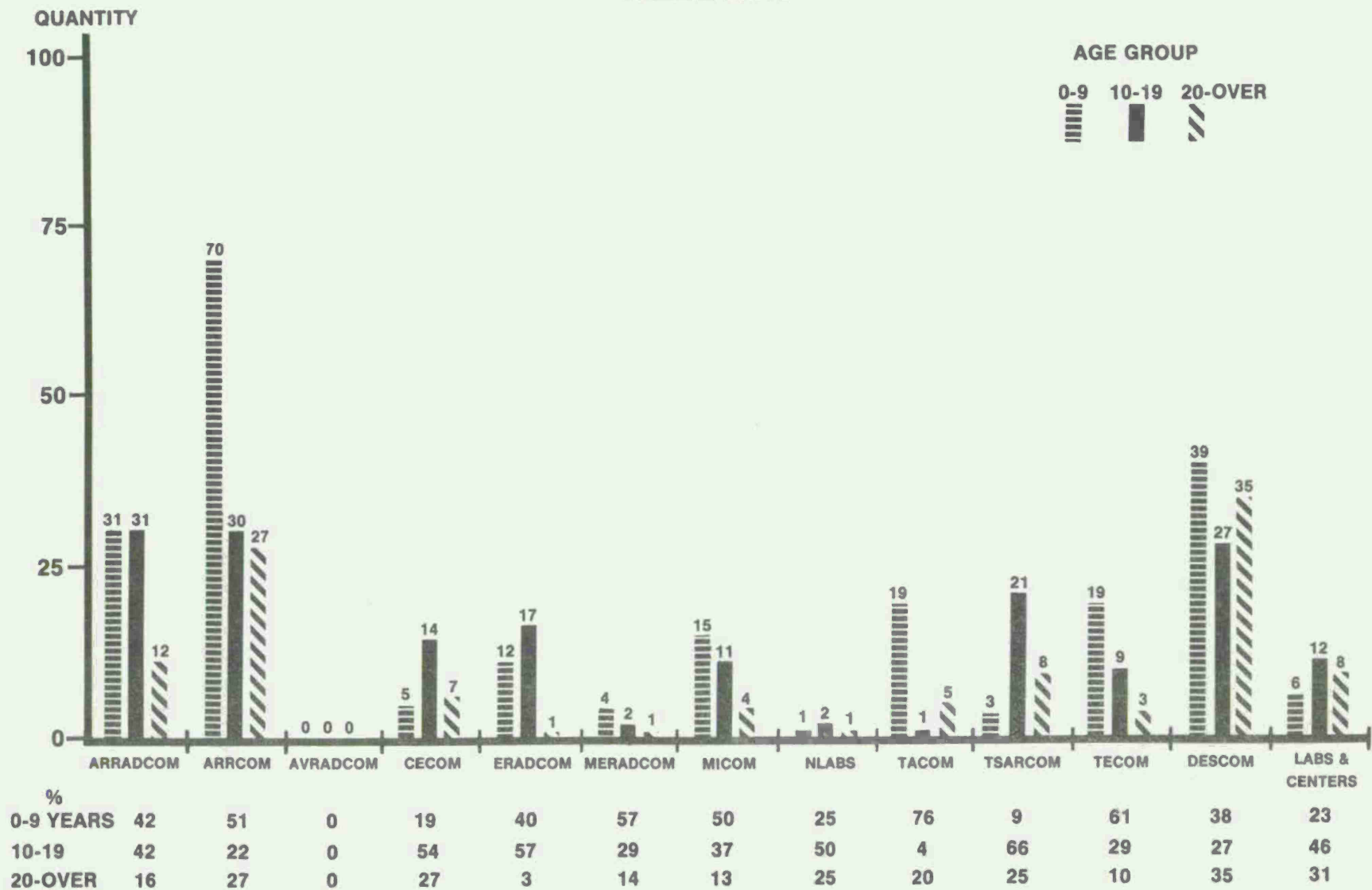


FIGURE III-2



# ACTIVE EQUIPMENT VINTAGE METAL FORMING

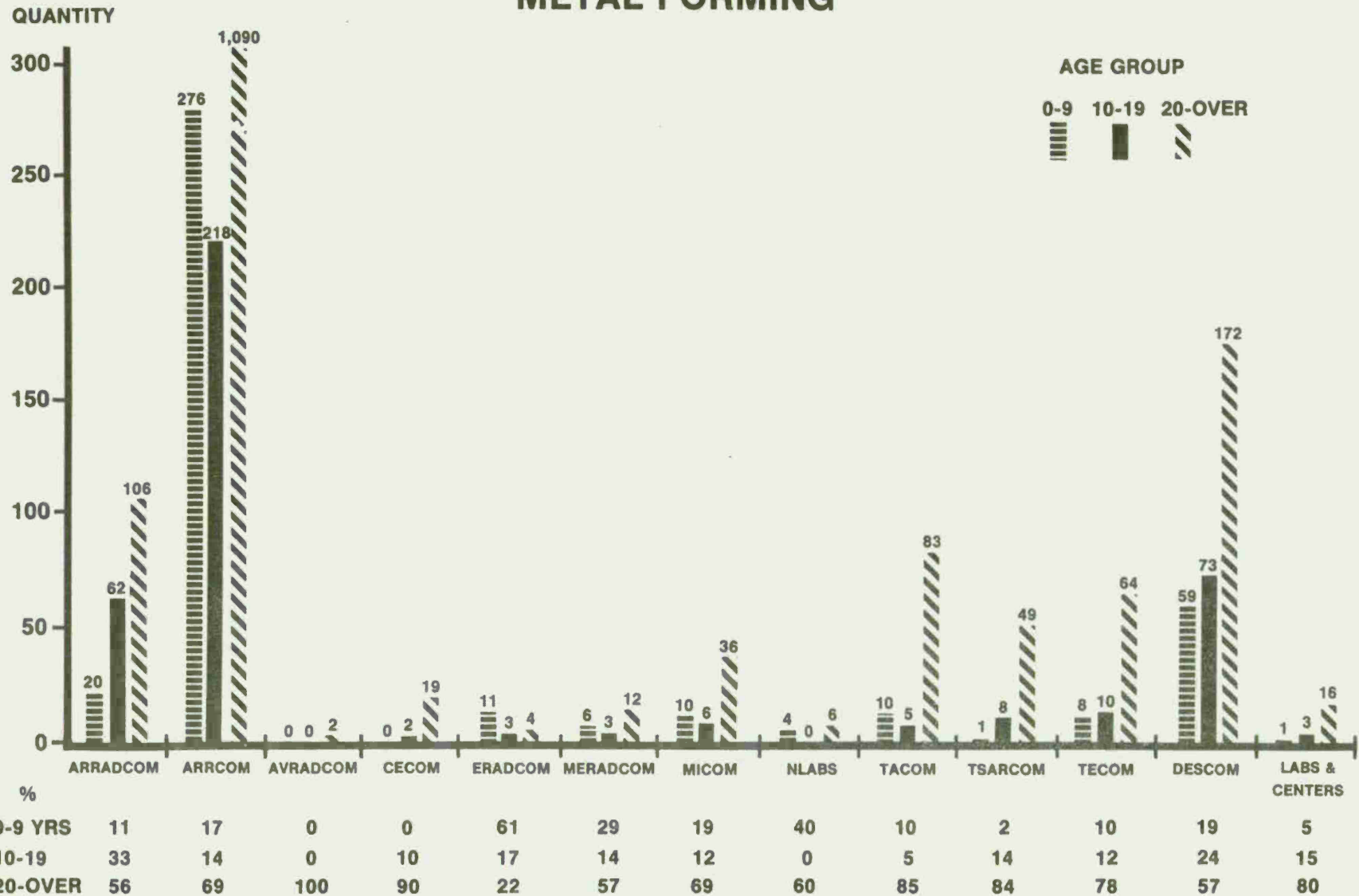


FIGURE III-3



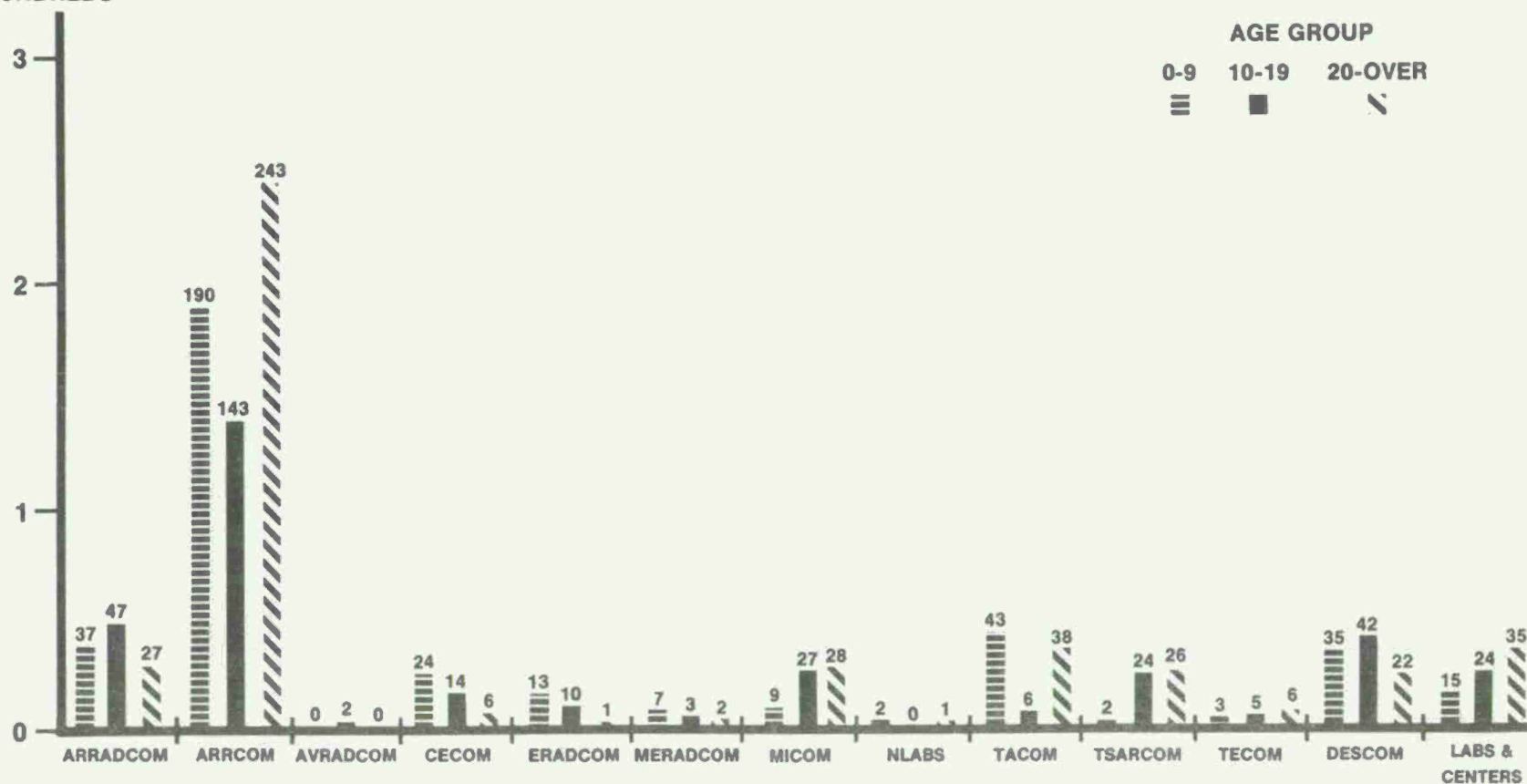
# ACTIVE EQUIPMENT VINTAGE HEAT TREAT & FURNACES

QUANTITY  
HUNDREDS

AGE GROUP

0-9 10-19 20-OVER

≡ ■ ▨



0-9 YRS	33	34	0	54	54	58	14	67	49	4	21	35	20
10-19	43	24	100	32	42	25	42	0	7	46	36	43	32
20-OVER	24	42	0	14	4	17	44	33	44	50	43	22	47

FIGURE III-4

# ACTIVE EQUIPMENT VINTAGE MECHANICAL TEST & MEAS

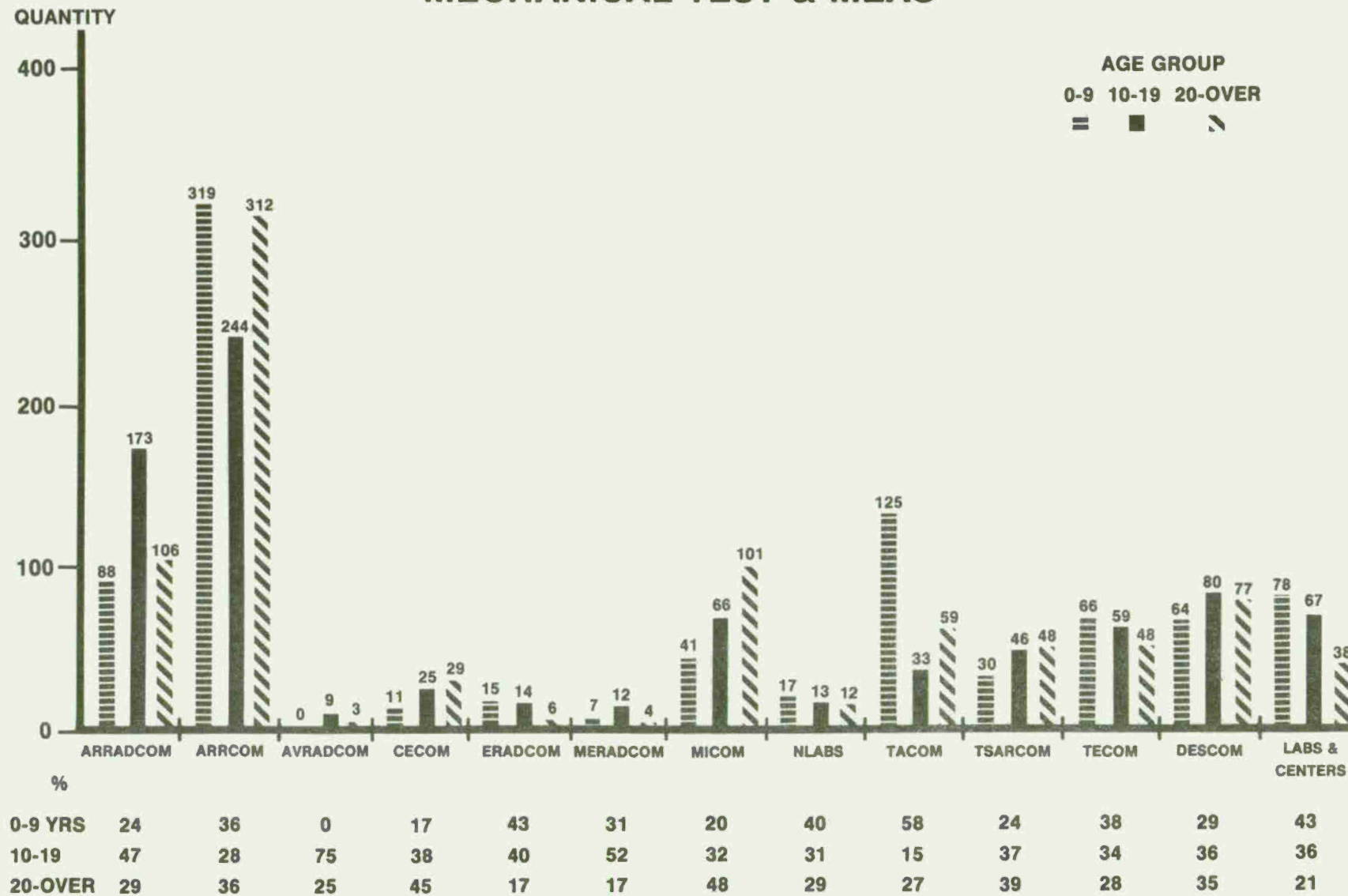


FIGURE III-5

Useful Service Life. The quantity and percent of each of the five types of equipment that exceed useful service life are shown in the following figures:

<u>Type</u>	<u>Figure</u>	<u>Page</u>
METALCUTTING	III-6	3-8
WELDING	III-7	3-9
METALFORMING	III-8	3-10
HEAT TREAT AND FURNACES	III-9	3-11
ELECTRICAL TESTING AND MEASURING	Decontrolled	
MECHANICAL TESTING AND MEASURING	III-10	3-12

The percent of metalcutting equipment that exceeds useful service life varies from 33 percent, or 46 items, being used by ERADCOM to 74 percent, or 1,111 items, controlled by TACOM. However, ARRCOM has the most equipment, 4,562 items or 62 percent, that exceed useful service life.

Welding equipment which exceeds useful service life varies from 7 percent (excluding AVRADCOM), or two items, belonging to ERADCOM to 50 percent, or two items controlled by NLABS. DESCOM and ARRCOM have the most items exceeding useful service life, both with 40 items.

TSARCOM has the highest percent of metalforming equipment which exceeds useful service life with 83 percent, or 48 items. ERADCOM has the lowest percent with 17 percent, or three items. ARRCOM has the greatest quantity, 1,035 items, exceeding useful service life which is 65 percent of their items.

ARRCOM has 215 items of heat treating equipment and furnaces that exceed useful service life, more than any other command within DARCOM. AVRADCOM, CECOM, and ERADCOM, with zero, nine, and four percent respectively, have the lowest percent exceeding useful service life. TSARCOM with 48 percent, or 25 items, has the highest percent exceeding useful service life.

Electrical testing and measuring equipment has been decontrolled and is no longer included in this study.

The 283 items, or 32 percent, of ARRCOM's mechanical testing and measuring equipment, which exceed useful service life are the most for a command within DARCOM. The percent exceeding useful service life for this type varies from eight percent, or one item, for AVRADCOM to 45 percent, or 94 items, for MICOM.

# ACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE METAL CUTTING

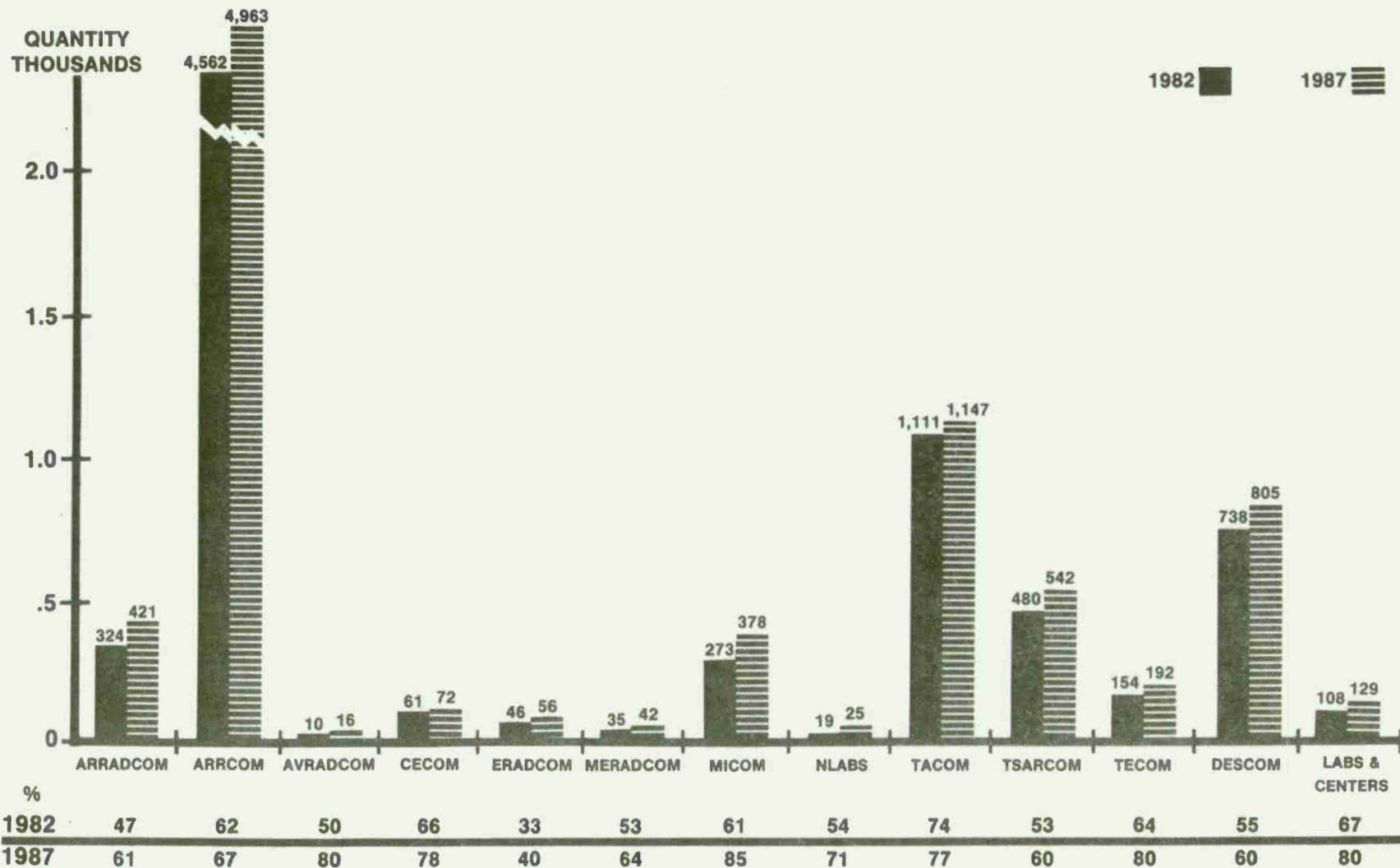


FIGURE III-6

# ACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE WELDING

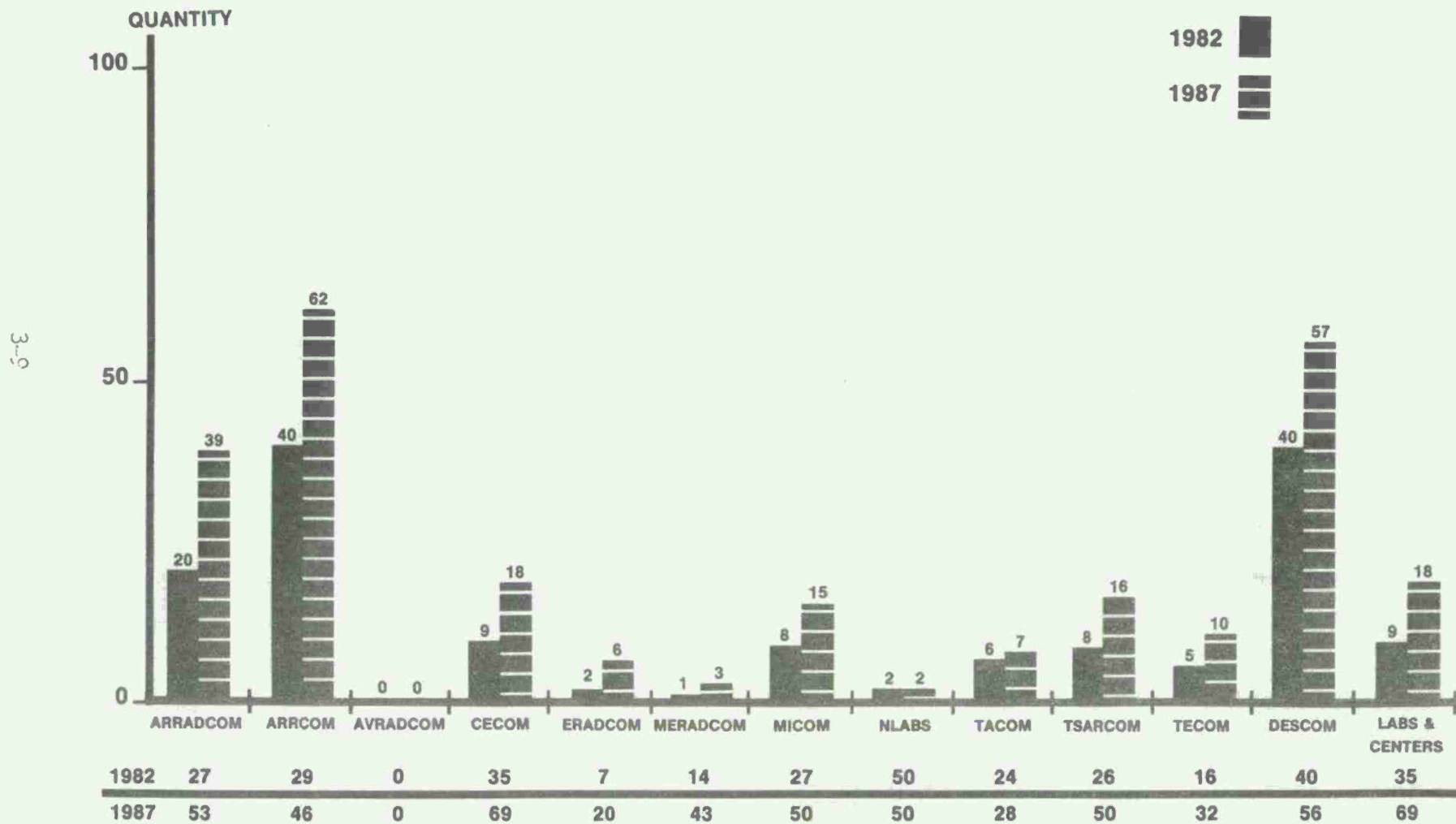


FIGURE III-7

# **ACTIVE EQUIPMENT** **QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE** **METAL FORMING**

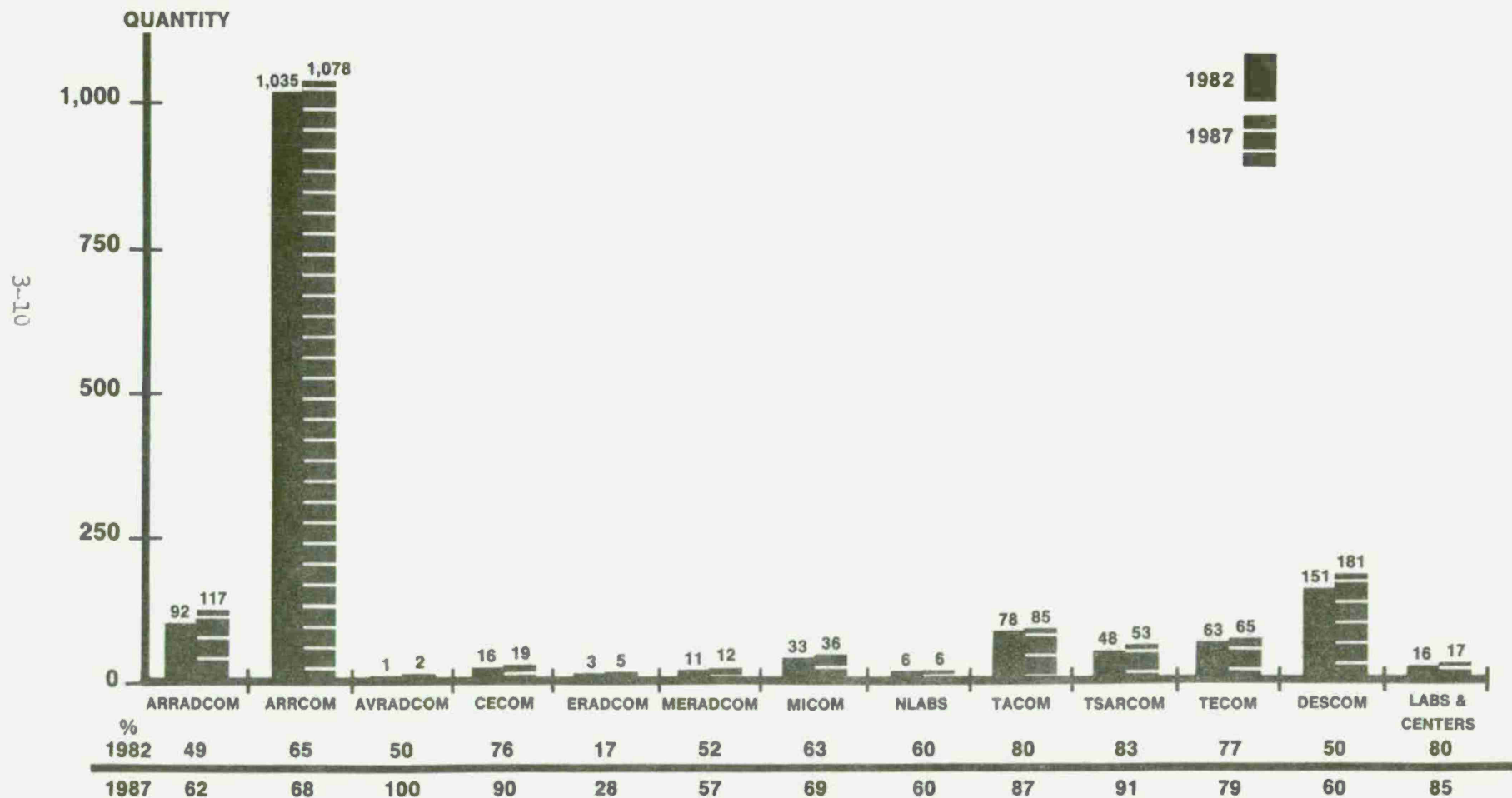


FIGURE III-8



# ACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE HEAT TREAT & FURNACES

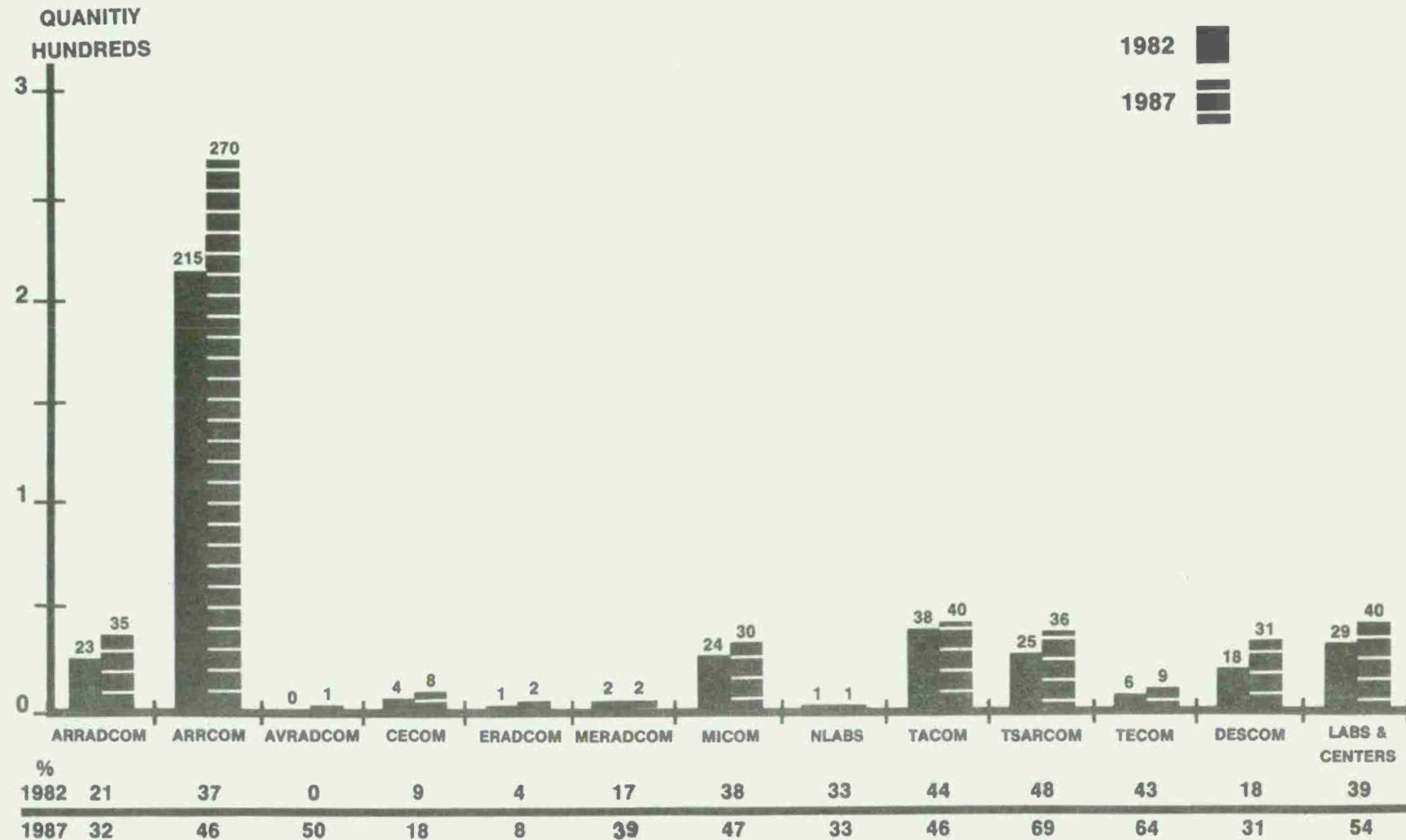


FIGURE III-9

# **ACTIVE EQUIPMENT** **QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE** **MECHANICAL TEST & MEASURE**

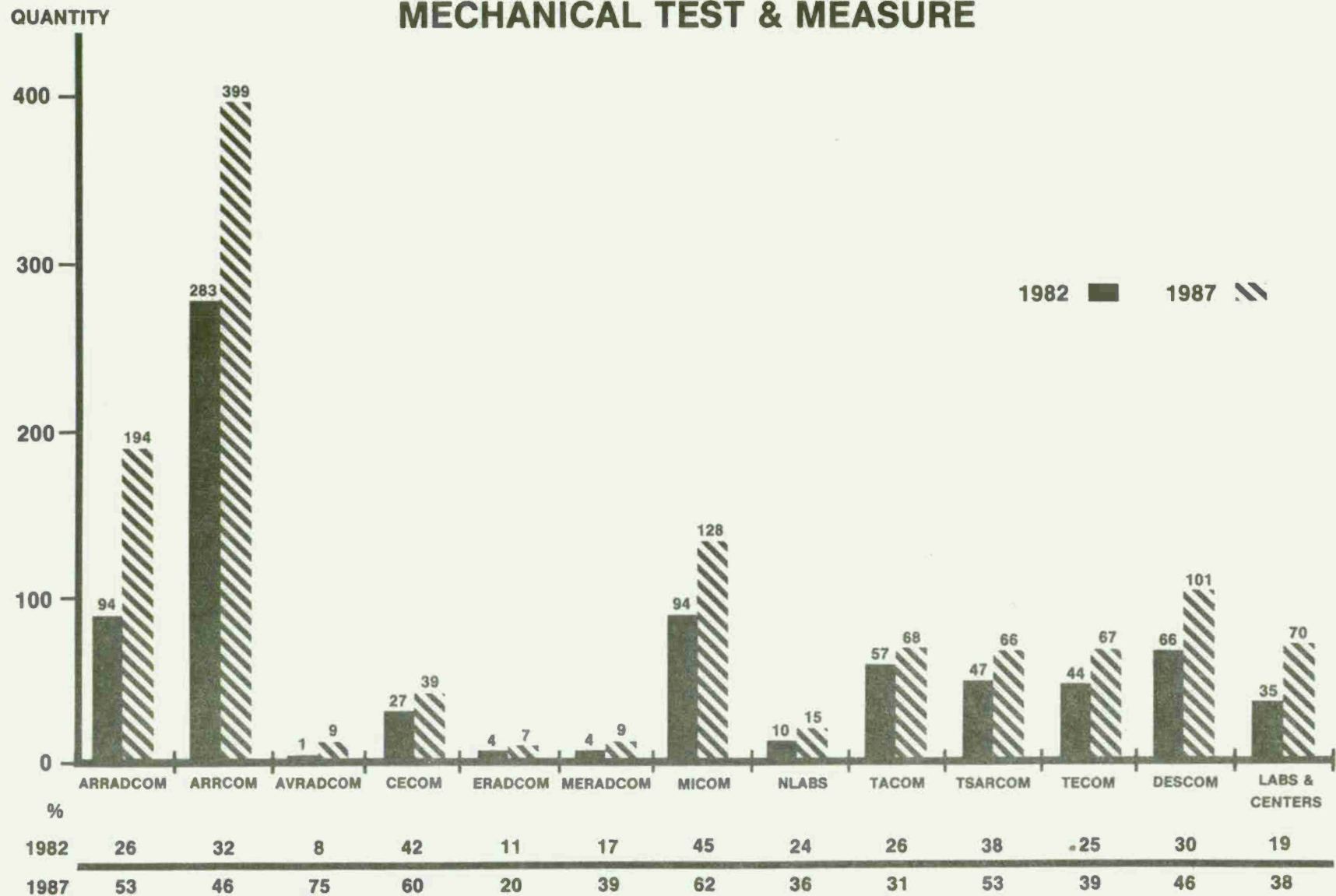


FIGURE III-10

## INACTIVE EQUIPMENT

Age Distribution (Vintage). The age distribution for each of the four types of equipment is shown in the following figures:

<u>Type</u>	<u>Figure</u>	<u>Page</u>
METALCUTTING	III-11	3-14
WELDING	III-12	3-15
METALFORMING	III-13	3-16
HEAT TREAT AND FURNACES	III-14	3-17
ELECTRICAL TESTING AND MEASURING	Decontrolled	
MECHANICAL TESTING AND MEASURING	III-15	3-18

As might be expected, the inactive equipment being retained by DARCOM in plant equipment packages (PEP's) has a much older age profile than active equipment.

The bulk of the metalcutting equipment is over 20 years old, varying from 84 percent for TSARCOM to 99 percent for TACOM. However, ARRCOM controls much more of this equipment with TACOM a distant second. Significantly, 88 percent of ARRCOM's 7,975 items and 99 percent of TACOM's 1,911 items are over 20 years old.

ARRCOM has the most welding equipment, 126 items. TACOM is second with 13 items. Fifty-one percent of ARRCOM's items and 84 percent of TACOM's items are over 20 years old. TSARCOM's only item is over 20 years old.

Metalforming equipment is predominantly over 20 years old. Eighty-nine percent of ARRCOM's items and 100 percent of TACOM's and TSARCOM's, items are over 20 years old. ARRCOM controls the bulk of this inactive equipment, 2,626 items, followed by TACOM with 29 items.

ARRCOM has by far the most heat treating equipment and furnaces, 503 items, or 67 percent over 20 years old. However, 93 percent of TACOM's 68 items are over 20 years old.

Electrical testing and measuring equipment has been decontrolled and is no longer included in this study.

ARRCOM has the bulk of the mechanical testing and measuring equipment that is being retained. Forty-five percent of that equipment, or 192 items, is over 20 years old. Ninety-five percent, 84 items, belonging to TACOM are over 20 years old. All four items controlled by TSARCOM are over 20 years old.

# INACTIVE EQUIPMENT VINTAGE METAL CUTTING

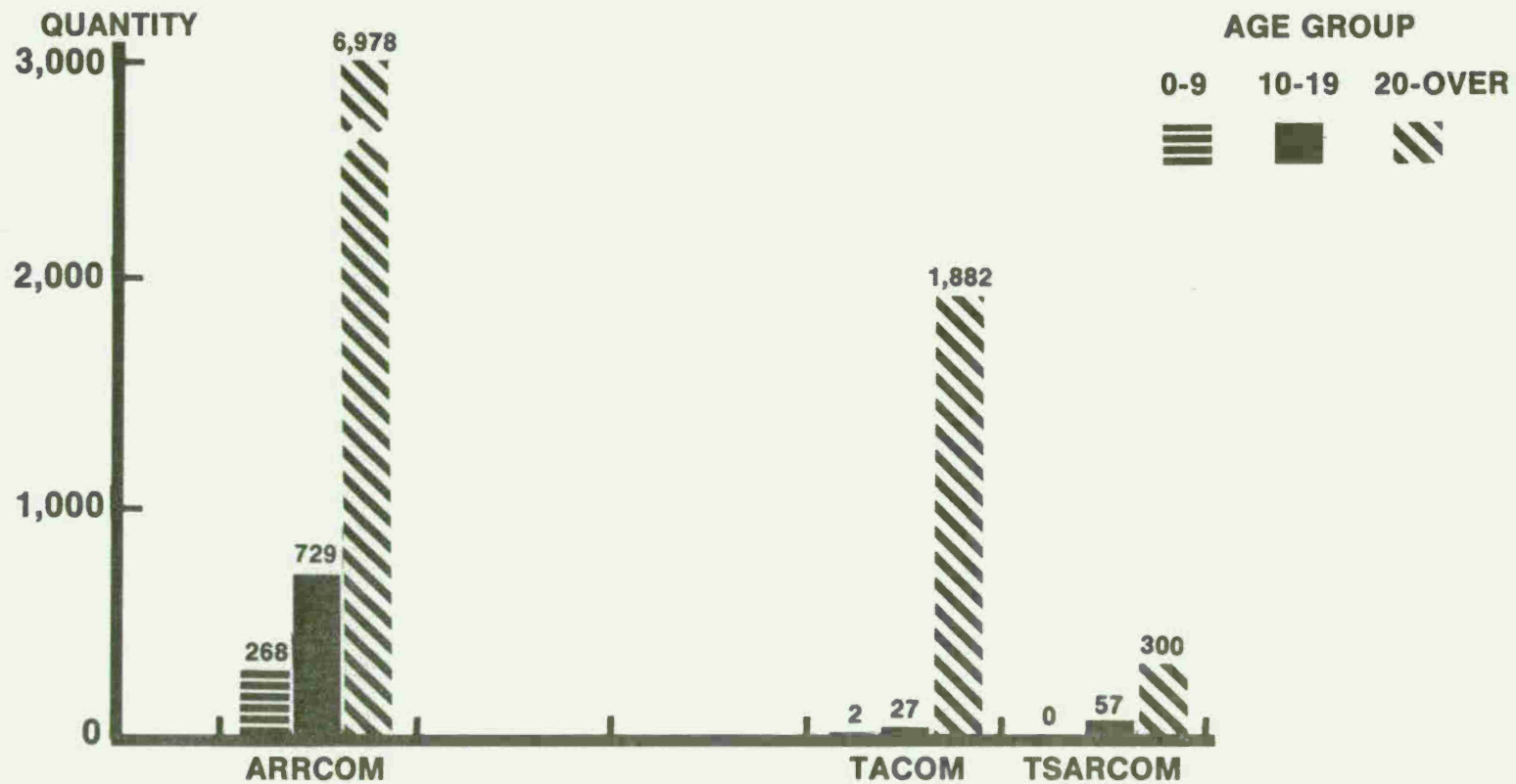
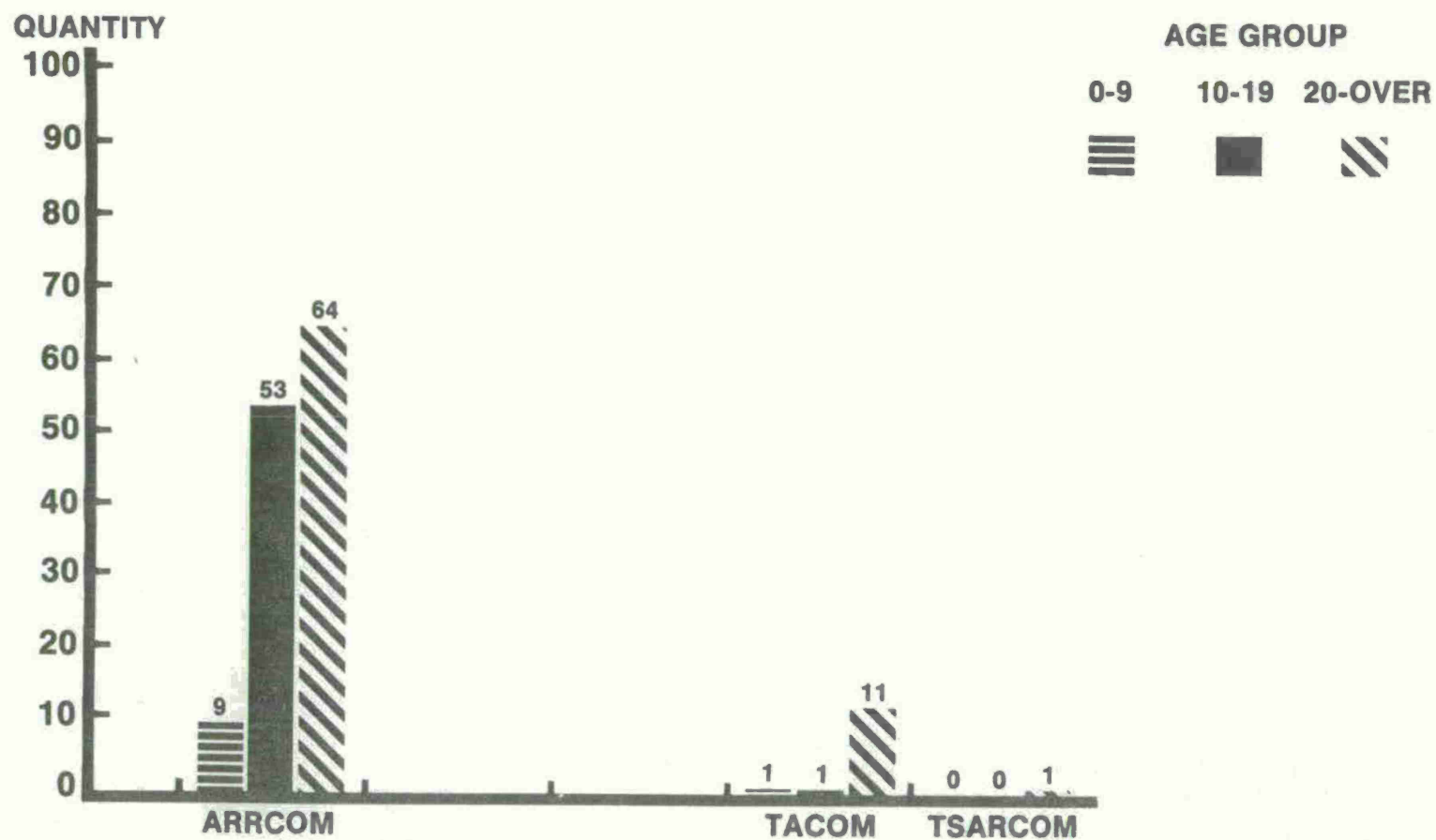


FIGURE III-11

# INACTIVE EQUIPMENT VINTAGE WELDING



## PERCENT

0-9 YRS    7  
10-19    42  
20-OVER    51

8    0  
8    0  
84    100

FIGURE III-12

# INACTIVE EQUIPMENT VINTAGE METAL FORMING

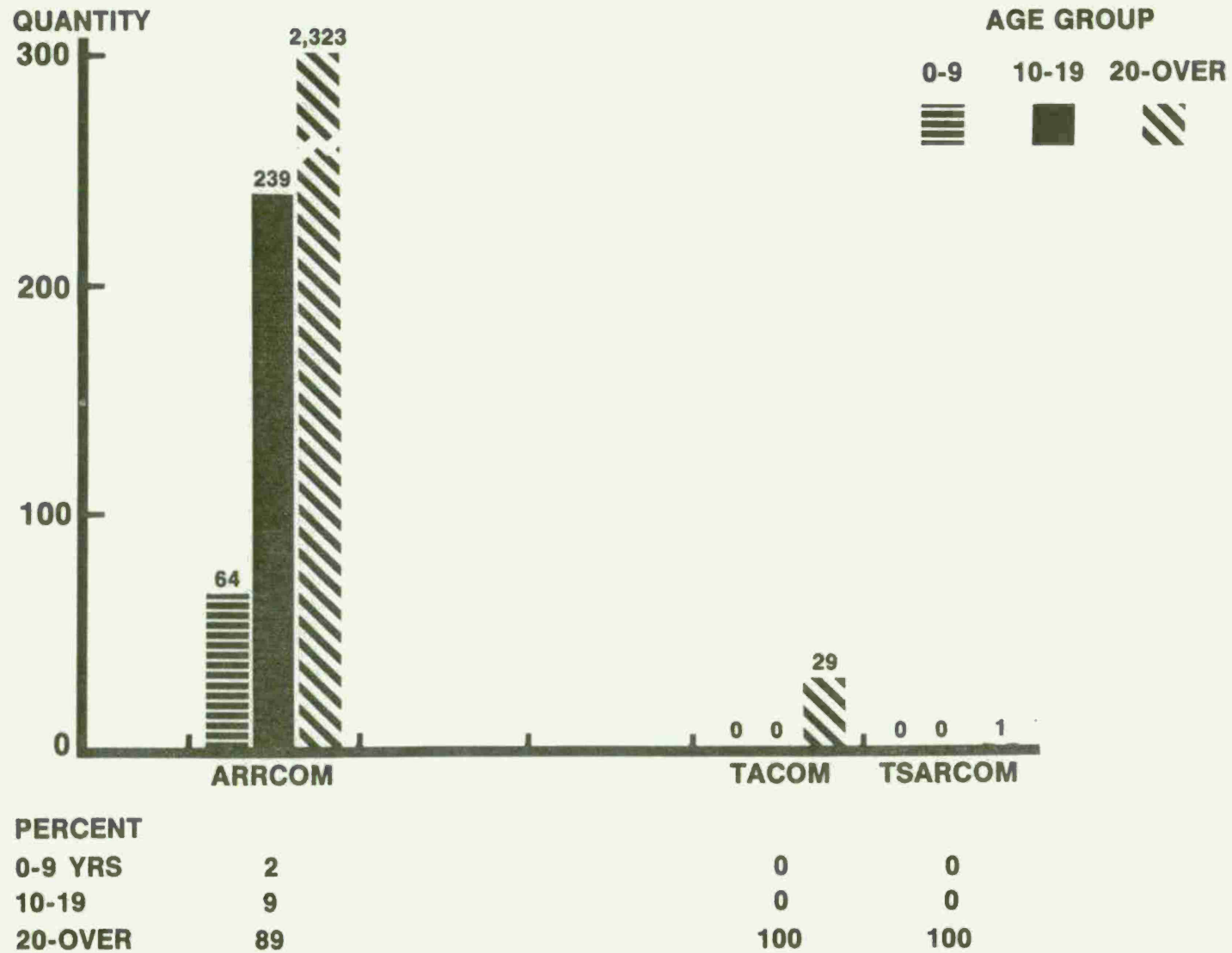
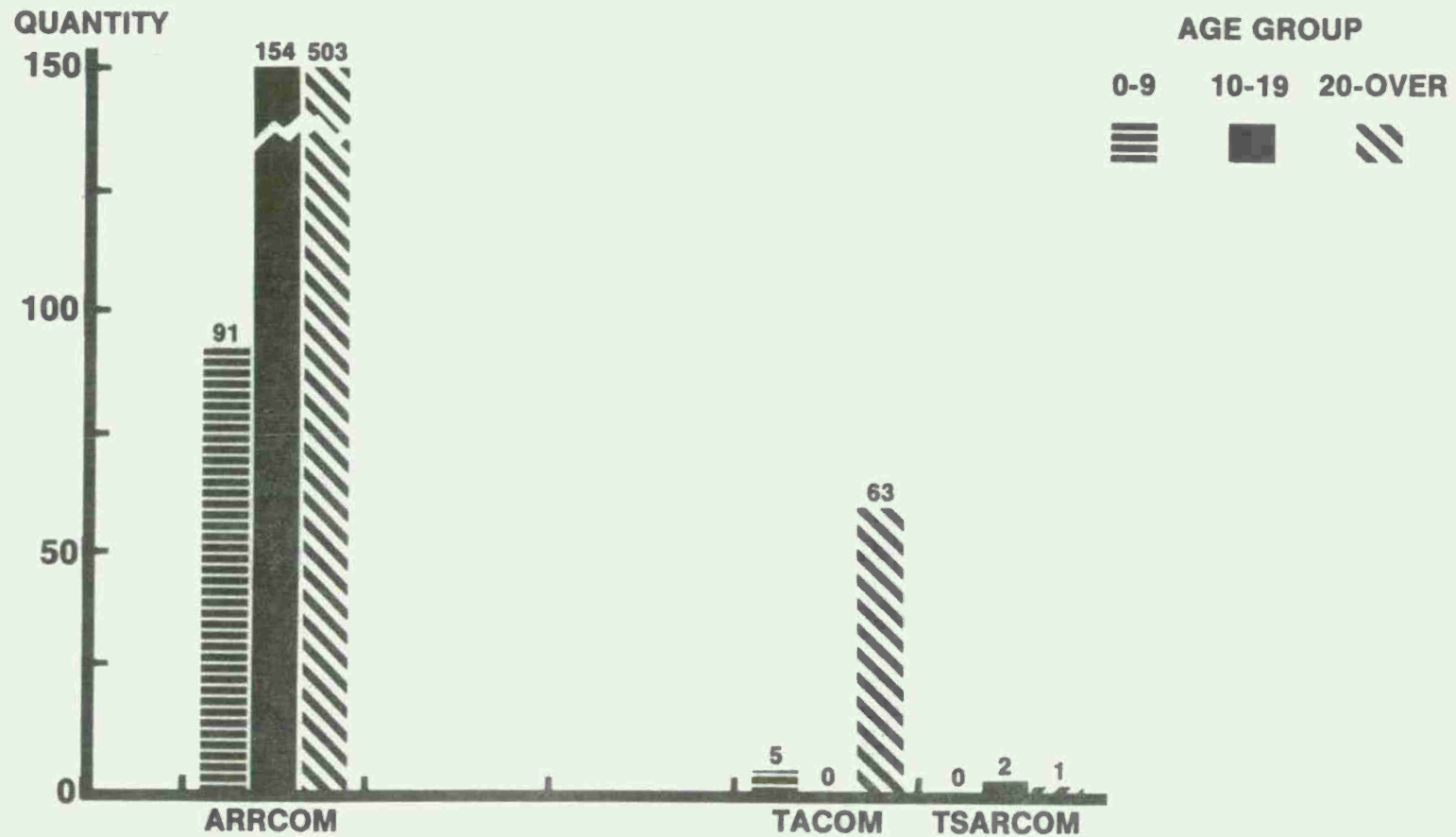


FIGURE III-13



# INACTIVE EQUIPMENT VINTAGE HEAT TREAT & FURNACES



## PERCENT

0-9 YRS	12	7	0
10-19	21	0	67
20-OVER	67	93	33

FIGURE III-14

# INACTIVE EQUIPMENT VINTAGE MECHANICAL TEST & MEAS

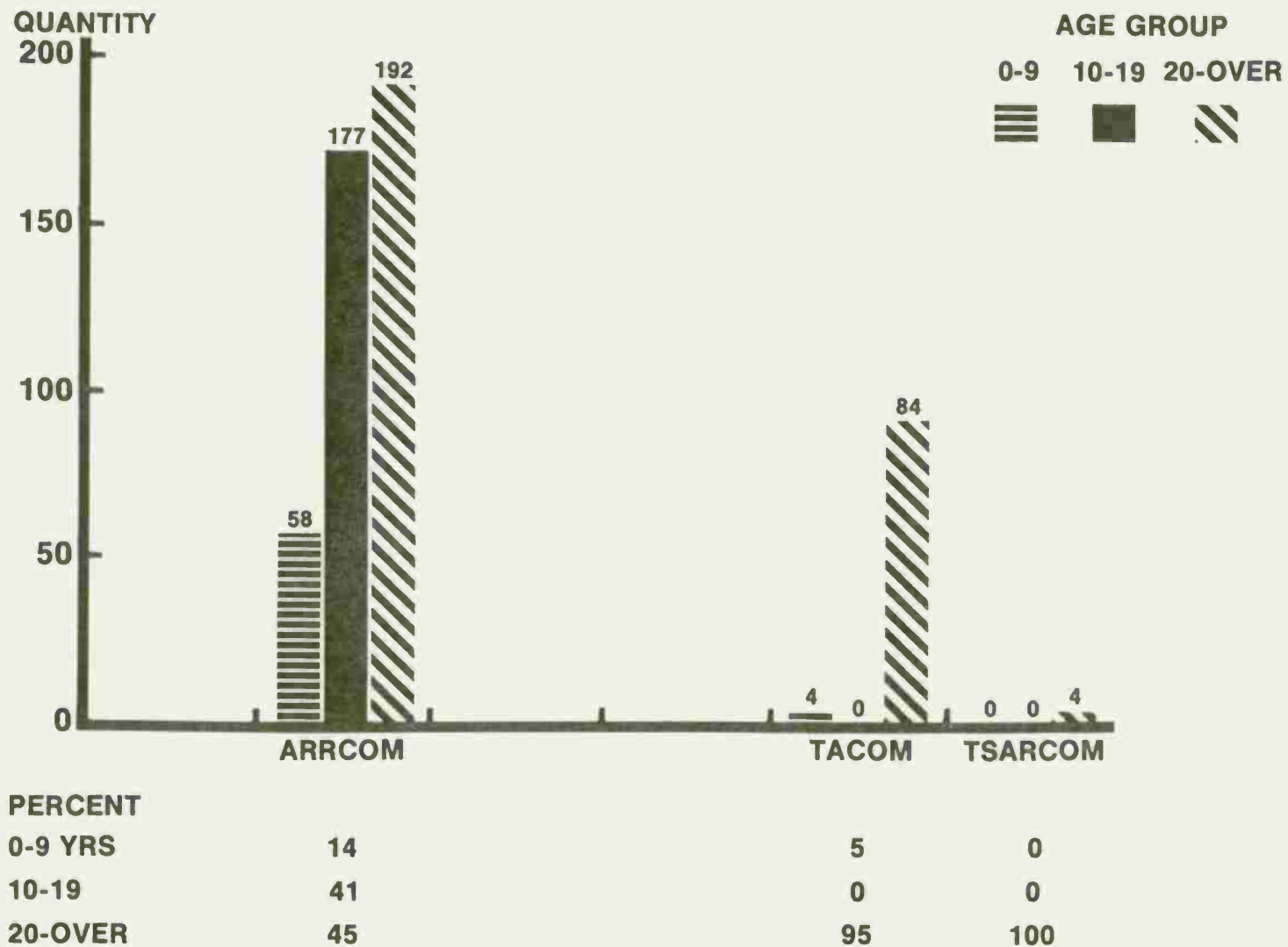


FIGURE III-15

Useful Service Life. The quantity and percent of each of the five types of equipment that exceed useful service life are shown in the following figures:

<u>Type</u>	<u>Figure</u>	<u>Page</u>
METALCUTTING	III-16	3-20
WELDING	III-17	3-21
METALFORMING	III-18	3-22
HEAT TREAT AND FURNACES	III-19	3-23
ELECTRICAL TESTING AND MEASURING	Decontrolled	
MECHANICAL TESTING AND MEASURING	III-20	3-24

Useful service life is heavily dependent on use which is not directly related to the age of inactive equipment. Therefore, a comparison of equipment age to useful service life for inactive equipment is of limited value.

ARRCOM and TACOM have almost all of the inactive equipment that exceeds useful service life.

A greater percentage of the equipment controlled by TACOM exceeds useful service life than that being retained by ARRCOM. However, ARRCOM has five times as much inactive equipment that exceeds its useful service life. TSARCOM has only small amounts of equipment that exceed useful service life compared to ARRCOM and TACOM.

# **INACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE METAL CUTTING**

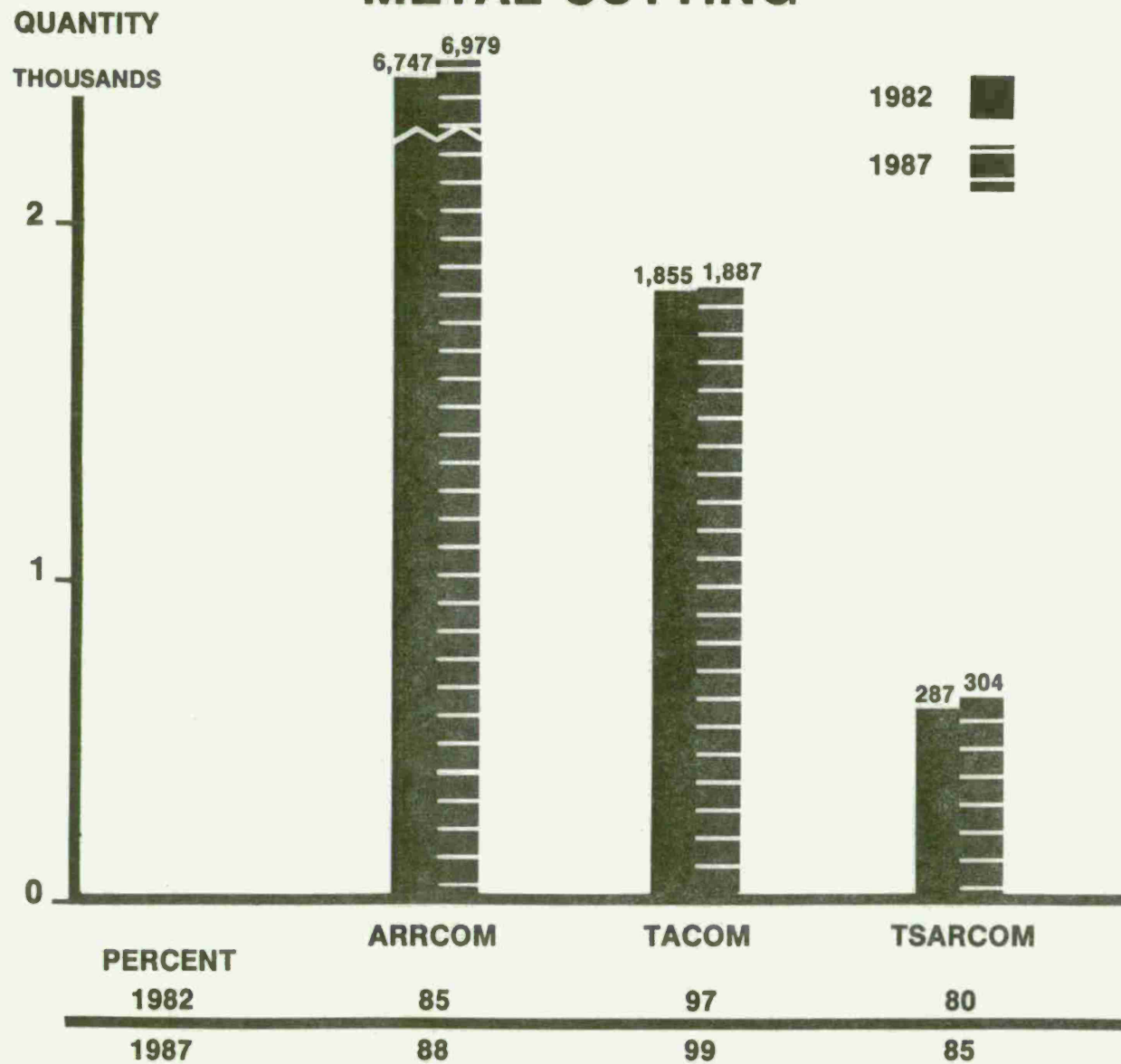


FIGURE III-16

# INACTIVE EQUIPMENT QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE WELDING

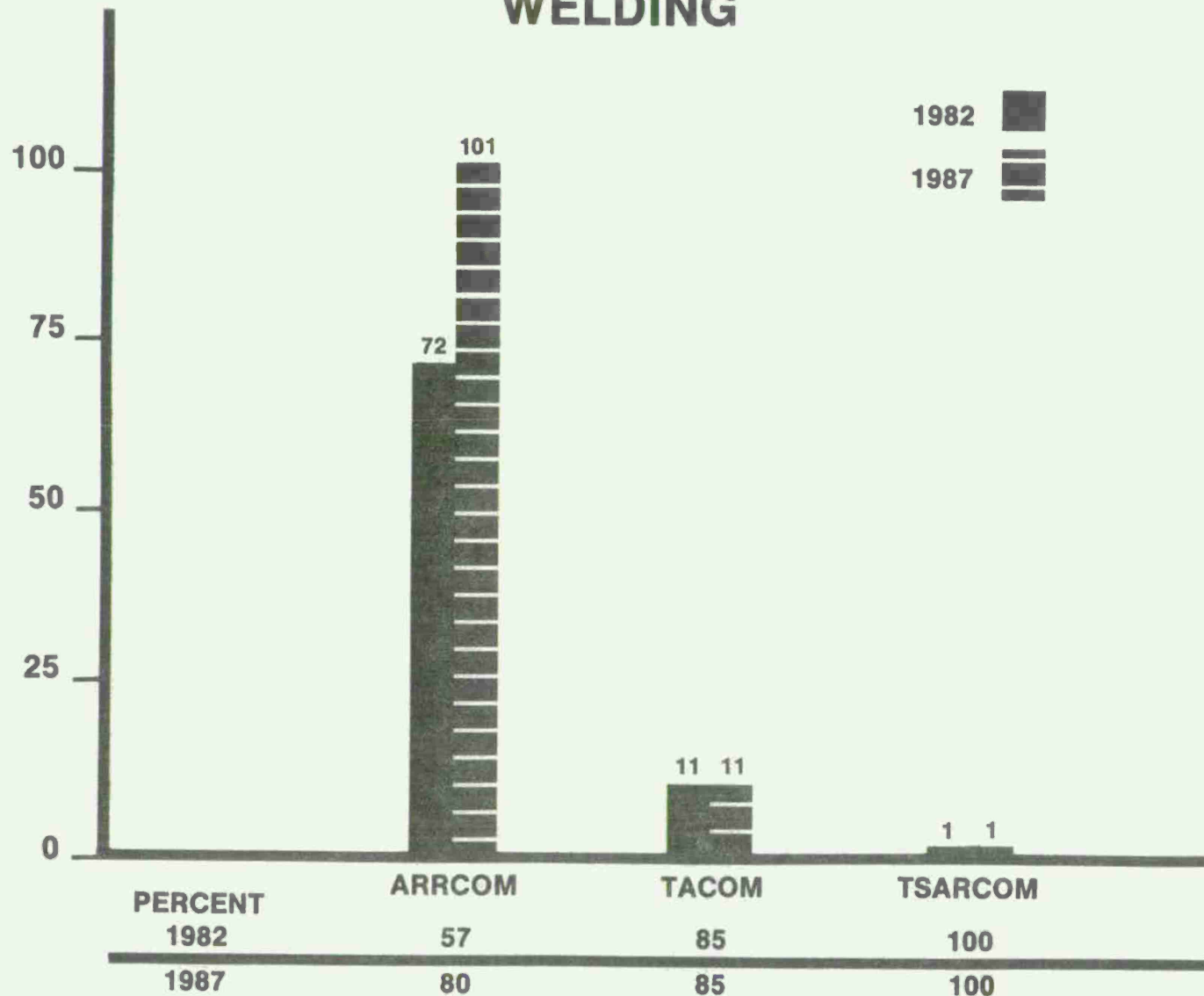


FIGURE III-17

# **INACTIVE EQUIPMENT** **QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE** **METAL FORMING**

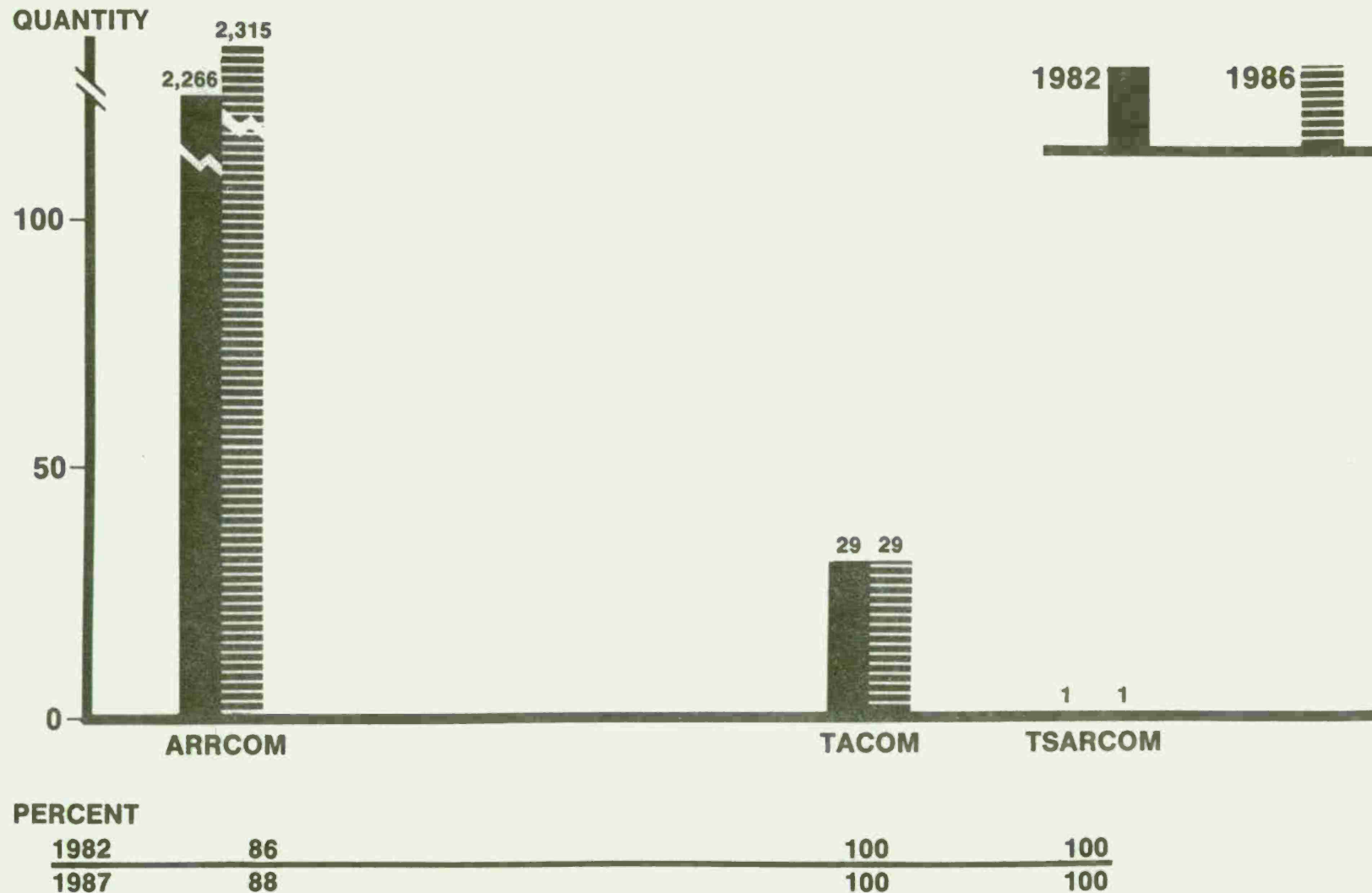


FIGURE III-18



# **INACTIVE EQUIPMENT** **QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE** **HEAT TREAT & FURNACES**

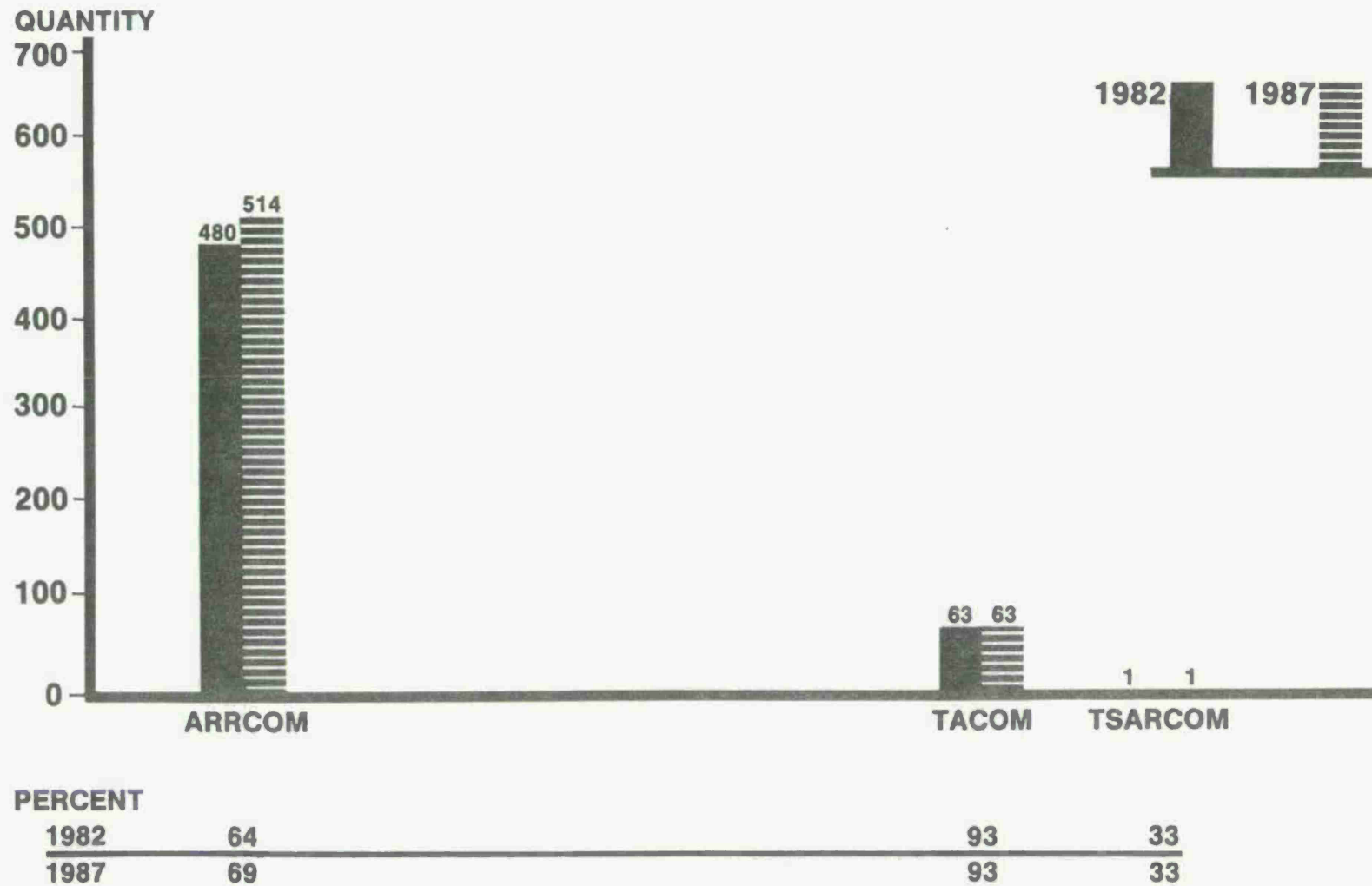


FIGURE III-19

# **INACTIVE EQUIPMENT** **QUANTITY & PERCENT EXCEEDING USEFUL SERVICE LIFE** **MECHANICAL TEST & MEASURE**

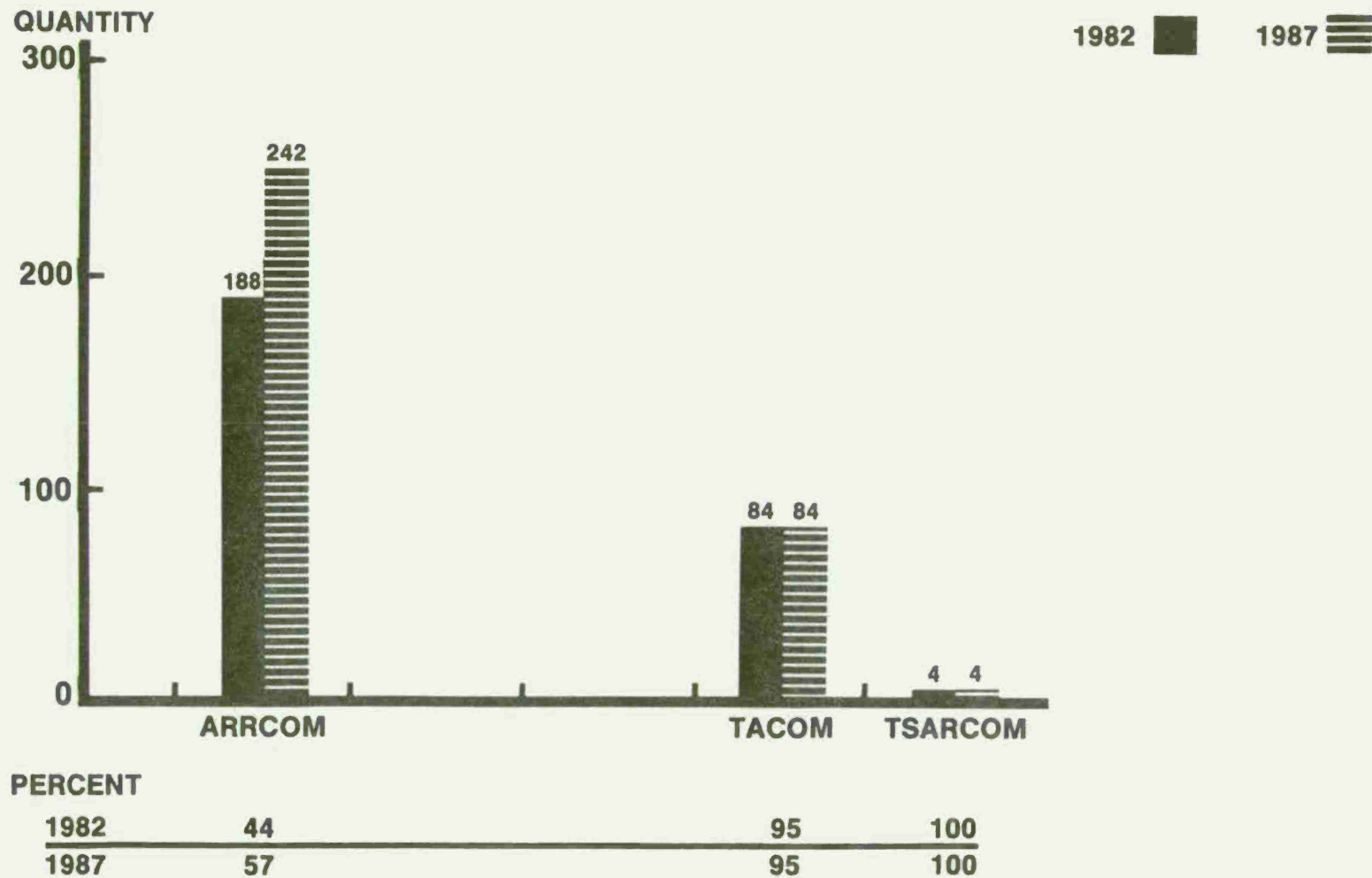


FIGURE III-20

## SECTION IV

### NUMERICAL CONTROL (NC)

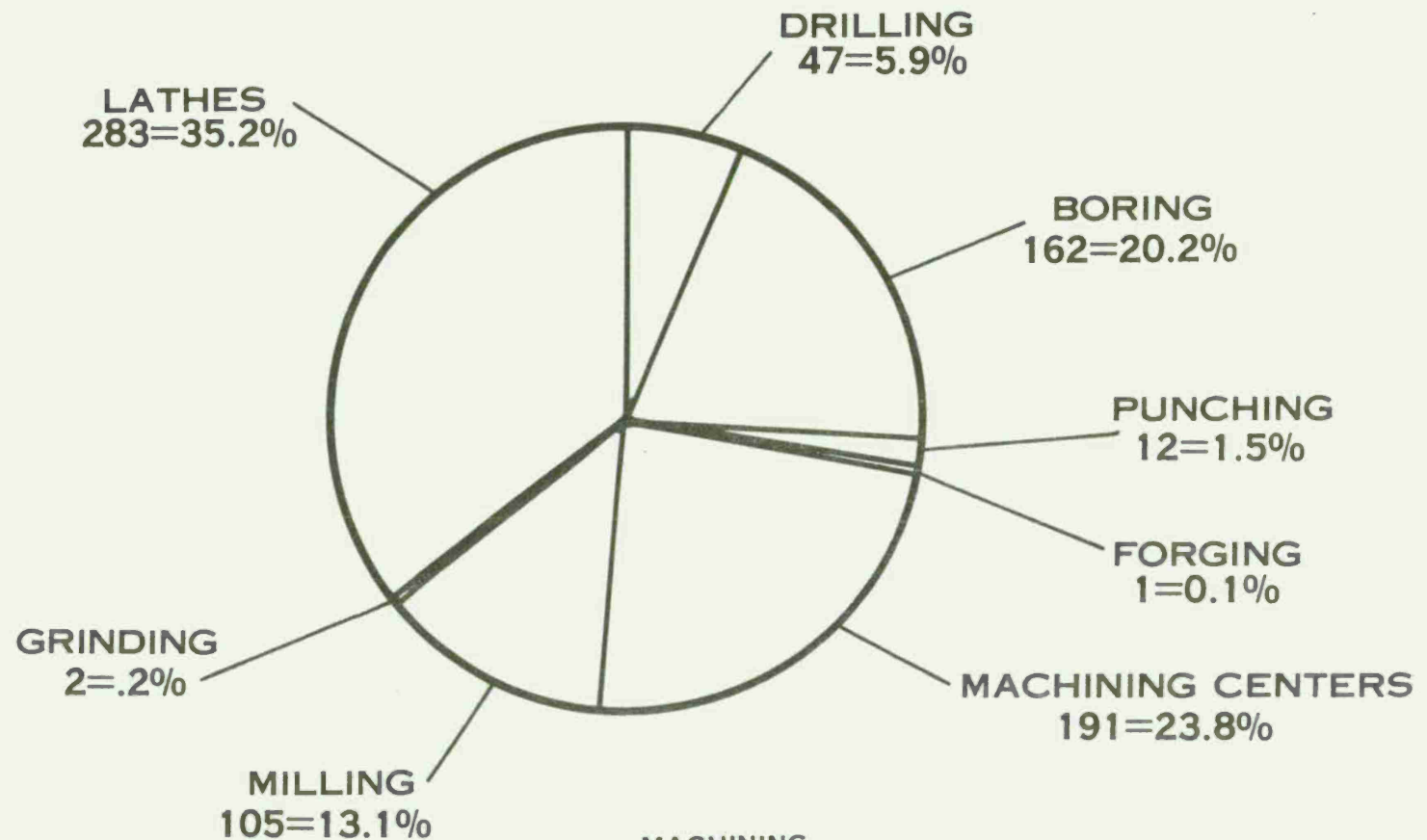
Numerical control (NC) is available in eight classes of metalworking equipment owned by the Army. These classes are: boring, drilling, lathes, milling, machining centers, punching, grinding, and forging. The Army inventory of this equipment is shown in Figure IV-1. Boring machines, lathes, and machining centers make up 79.2 percent of the inventory, or 636 items. Punching, grinding, and forging machines represent only 1.8 percent of the inventory, or 15 items.

Numerically controlled machines make a significant contribution to the production capacity of the industrial base and represent a sizeable investment. The Army numerical control inventory consists of 803 items with an acquisition cost of \$190,567,103. All but one of these items are controlled by DARCOM. The distribution of the NC inventory is shown in Figure IV-2. Government-owned, Government-operated (GOGO) facilities are using 20 percent, or 164, of the items and have an additional 7 percent, or 54 items, subject to intermittent use, but required to remain in place in support of the current assigned mission. Government-owned, Contractor-operated (GOCO) facilities have 18 percent, or 144 items, and 25 percent, or 202 items, is provided to contractor-owned, contractor-operated facilities as Government furnished equipment, (GFE). The remaining 30 percent, or 239 items, is assigned to plant equipment packages (PEP's) for use in mobilization production. The significant increase in the number of PEP items resulted from additions to the inventory by ARRCOM.

The trend of the inventory of numerically controlled equipment is shown in Figure IV-3. An increasing trend characterizes the inventory, especially since 1978. The disproportionate increase in acquisition cost shown in 1978 is attributable to the addition of the rotary forge at Watervliet Arsenal at a cost of \$6,749,185. The average cost of numerical control equipment has continued to increase at a rapid rate to \$229,426.

The source of the data for numerical control equipment is the DIPEC SP-50 Report as of 28 Jan 83.

# NUMERICAL CONTROL INVENTORY BY CLASS



	BORING (3411)	DRILLING (3413)	LATHES (3416)	MILLING (3417)	MACHINING CENTERS (3408)	PUNCHING (3445)	GRINDING (3415)	FORGING (3446)	TOTAL
ACTIVE	141	34	249	88	181	7	2	1	703
INACTIVE	12	6	17	8	3	0	0	0	46
INT. USE (3H)	<u>9</u>	<u>7</u>	<u>17</u>	<u>9</u>	<u>7</u>	<u>5</u>	<u>0</u>	<u>0</u>	<u>54</u>
TOTALS	162	47	283	105	191	12	2	1	803

FIGURE IV-1

# NUMERICAL CONTROL INVENTORY QUANTITY AND USE

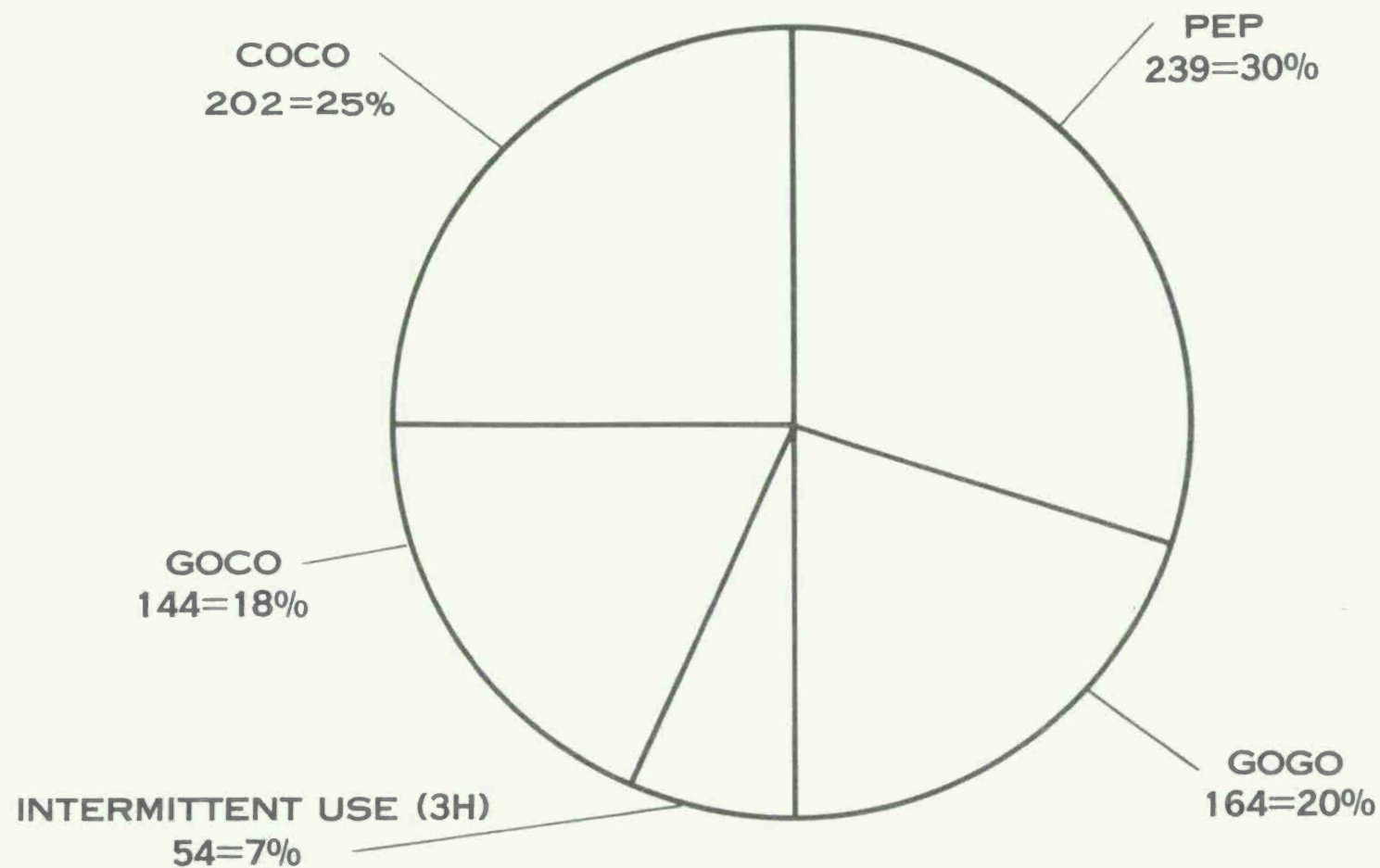
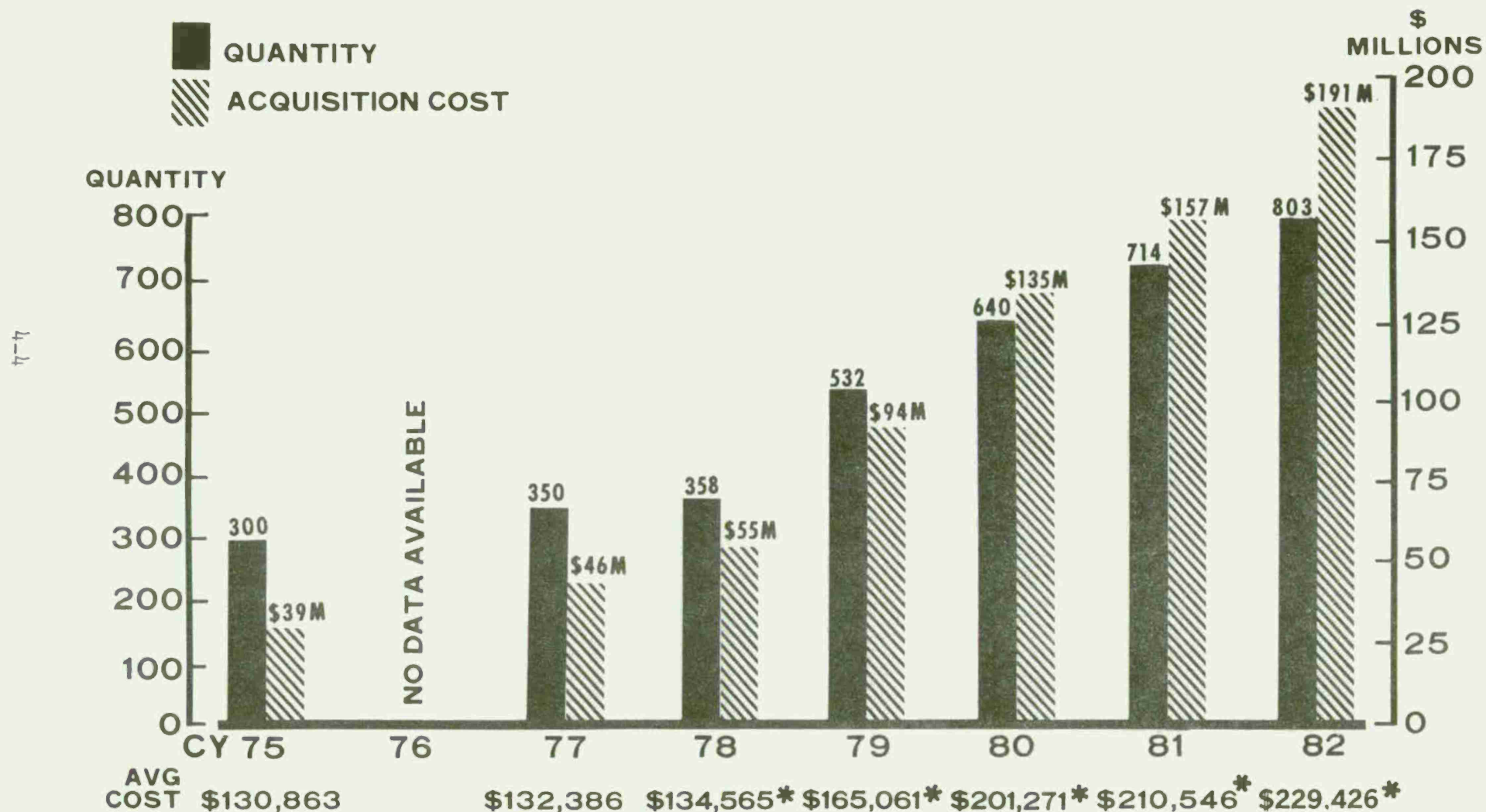


FIGURE IV-2



# INVENTORY TRENDS NUMERICAL CONTROL EQUIPMENT



NOTE: \*AVERAGE COST DOES NOT INCLUDE THE ROTARY FORGE AT WATERVLIET ARSENAL WITH A COST OF \$6,749,185.

FIGURE IV-3



APPENDIX A

Illustrations of Types of Industrial Plant Equipment (IPE)

with

Federal Supply Classes (FSC's)

## APPENDIX A

### Illustrations of Types of Industrial Plant Equipment (IPE)

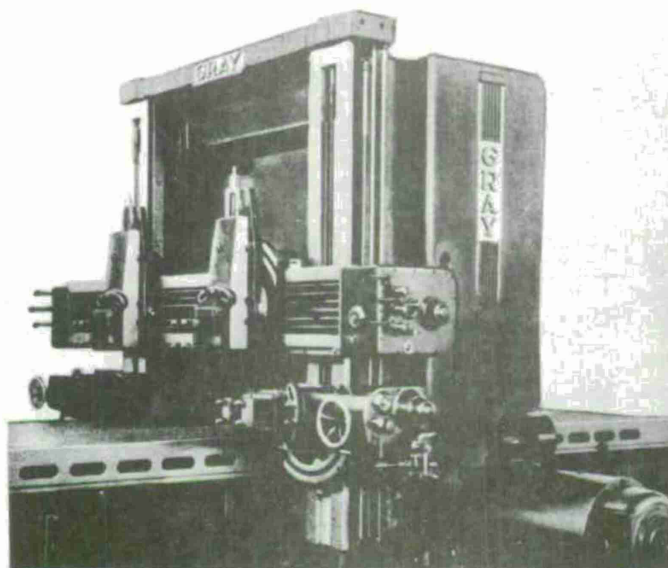
with

Federal Supply Classes (FSC)

#### METALCUTTING

##### FSC

- 3405 Saw and Filing Machines
- 3408 Machining Centers and  
Way Type Machines
- 3410 Electrical and Ultrasonic  
Erosion Machines
- 3411 Boring Machines
- 3412 Broaching Machines
- 3413 Drilling and Tapping  
Machines
- 3414 Gear Cutting and Finishing  
Machines
- 3415 Grinding Machines
- 3416 Lathes
- 3417 Milling Machines
- 3418 Planers and Shapers
- 3419 Miscellaneous Machine Tools



72" x 72" x 20"  
PLANER

#### WELDING

##### FSC

- 3431 Electric Arc Welding Equipment
- 3432 Electric Resistance Welding  
Equipment
- 3433 Gas Welding, Heat Cutting and  
Metalizing Equipment
- 3436 Welding Positioners and  
Manipulators
- 3438 Miscellaneous Welding Equipment

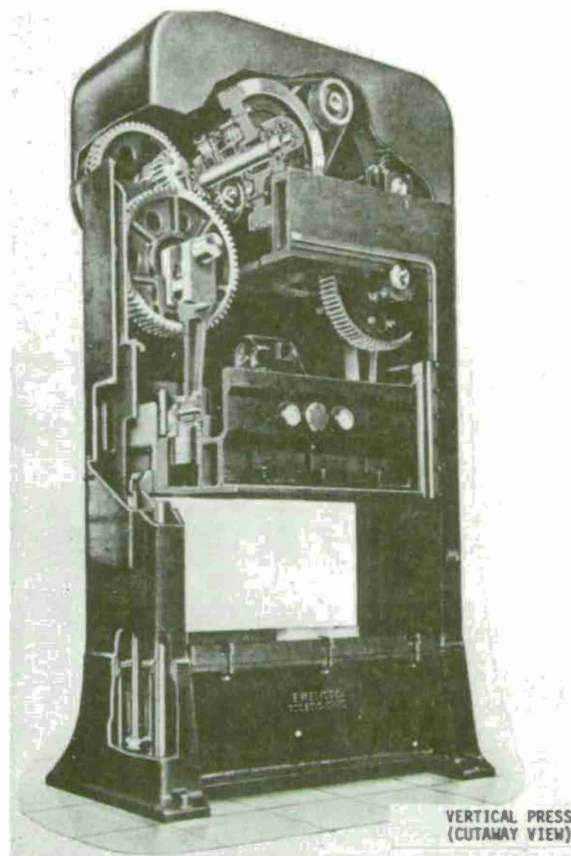


ENGINE DRIVEN  
ARC WELDER

## **METAL FORMING**

### **FSC**

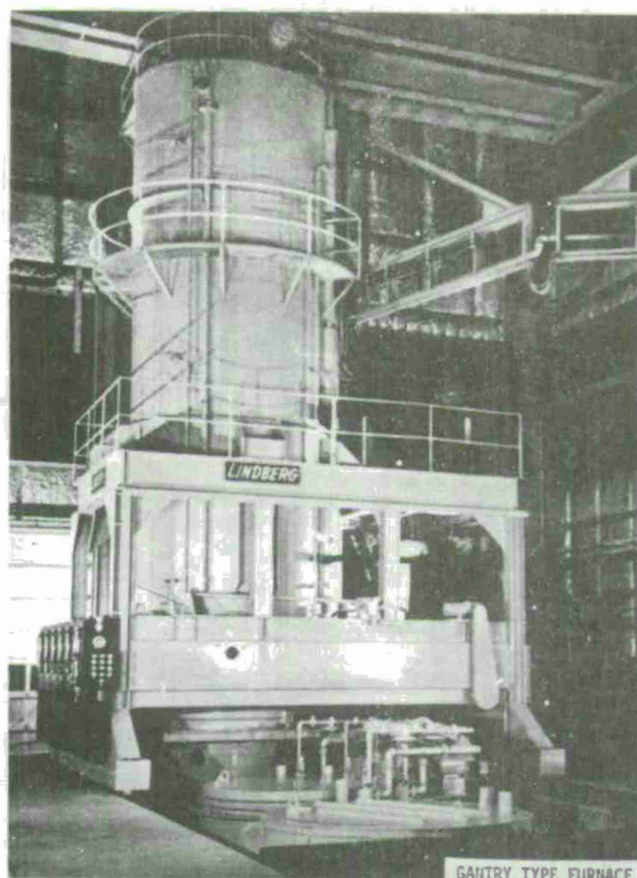
- 3422 Rolling Mills and Drawing Machines
- 3441 Bending and Forming Machines
- 3442 Hydraulic and Pneumatic Presses, Power Driven
- 3443 Mechanical Power Presses, Power Driven
- 3444 Manual Presses
- 3445 Punching and Shearing Machines
- 3446 Forging Machinery and Hammers
- 3447 Wire and Metal Ribbon Forming Machines
- 3448 Riveting Machines



## HEAT TREAT AND FURNACES

### FSC

- 3424 Metal Heat Treating and  
Nonthermal Treating  
Equipment
- 4430 Industrial Furnaces, Kilns,  
Lehrs, and Ovens



GANTRY TYPE FURNACE

## ELECTRICAL TESTING AND MEASURING DEVICES

### FSC

- 6625 Electrical and Electronic  
Properties Measuring and  
Testing Instruments

DECONTROLLED

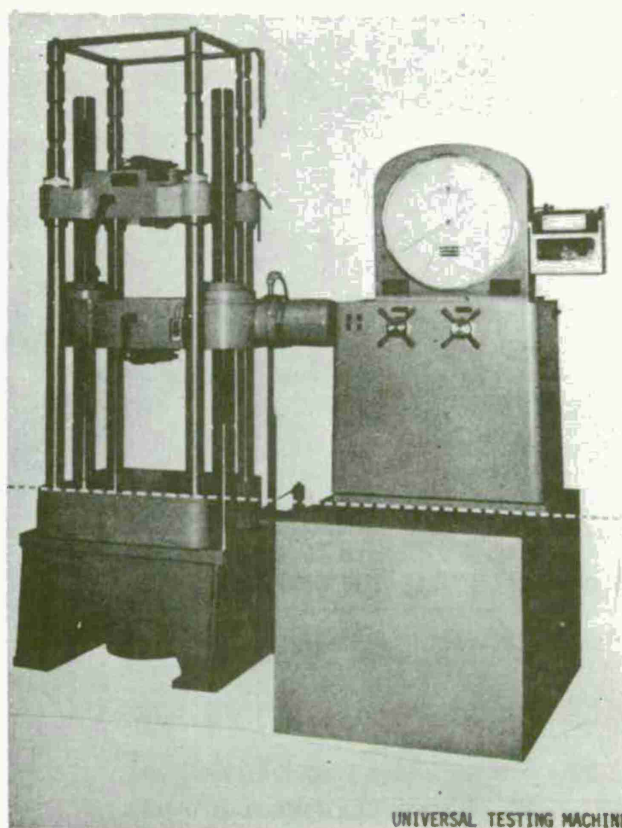


DIGITAL MULTIMETER  
(TEST EQUIPMENT)

**MECHANICAL TESTING AND  
MEASURING DEVICES**

FSC

6635      Physical Properties Testing  
             Equipment



UNIVERSAL TESTING MACHINE

